Series 1959, No. 27

Issued July 1963

SOIL SURVEY

Habersham County Georgia

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
UNITED STATES FOREST SERVICE
and the
UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATIONS

HOW TO USE THE SOIL SURVEY REPORT

THIS SOIL SURVEY of Habersham County, Ga., will serve several groups of readers. It will help farmers in planning the kind of management that will protect their soils and provide good yields; assist engineers in selecting sites for roads, buildings, ponds, and other structures; aid foresters in managing woodlands; and add to our knowledge of soil science.

Locating Soils

Use the *index to map sheets* at the back of this report to locate areas on the large map. The index is a small map of the county on which numbered rectangles have been drawn to show where each sheet of the large map is located. When the correct sheet of the large map has been located, it will be seen that boundaries of the soils are outlined, and that there is a symbol for each kind of soil. All areas marked with the same symbol are the same kind of soil, wherever they appear on the map. The symbol is inside the area if there is enough room; otherwise, it is outside the area and a pointer shows where the symbol belongs.

Finding Information

Special sections in this report will interest different groups of readers, and some sections will be of interest to all.

Farmers and those who work with farmers can learn about the soils in the section "Descriptions of Soils" and then turn to the section "Use and Management of Soils for Crops." In this way, they first identify the soils on their farm and then learn how these soils can be managed and what yields can be expected. The "Guide to Mapping Units" at the back of the report will simplify use of the map and the report. This guide lists, according to the alphabetic order of their map symbols, the name of each soil and land type mapped in this county and the page where each of these is described. It also lists, for each soil and land type, the capability unit and the woodland suitability group, and the page where each of these is discussed.

Foresters and others interested in woodland can refer to the section "Woodland." In that section, the soils in the county are grouped according to their suitability for trees, and factors affecting the management of woodland are explained.

Engineers will want to refer to the section "Engineering Applications." Tables in that section show characteristics of the soils that affect engineering.

Scientists and others who are interested will find information about how the soils were formed and how they were classified in the section "Formation and Classification of Soils."

Students, teachers, and other users will find information about soils and their management in various parts of the report, depending on their particular interest.

Newcomers in Habersham County will be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the Area," which gives additional information about the county.

* * * * *

Fieldwork for this survey was completed in 1959. Unless otherwise indicated, all statements in the report refer to conditions in the county at that time. The soil survey of most of the county is part of the technical assistance furnished to the Upper Chattahoochee River Soil and Water Conservation District. Within the Chattahoochee National Forest, the soil survey was made by scientists of the United States Forest Service.

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SOIL SURVEY OF HABERSHAM COUNTY, GEORGIA

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FIELD SURVEY BY STANLEY M. ROBERTSON AND SIDNEY M. JONES, SOIL CONSERVATION SERVICE, AND T. W. GREEN AND CHESTER ROBINSON, U.S. FOREST SERVICE.

UNITED STATES DEPARTMENT OF AGRICULTURE IN COOPERATION WITH THE U.S. FOREST SERVICE AND THE UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE, AGRICULTURAL EXPERIMENT STATIONS

HABERSHAM COUNTY is 283 square miles in area and occupies parts of the Piedmont Plateau and the Blue Ridge Mountains (fig. 1). The climate is generally

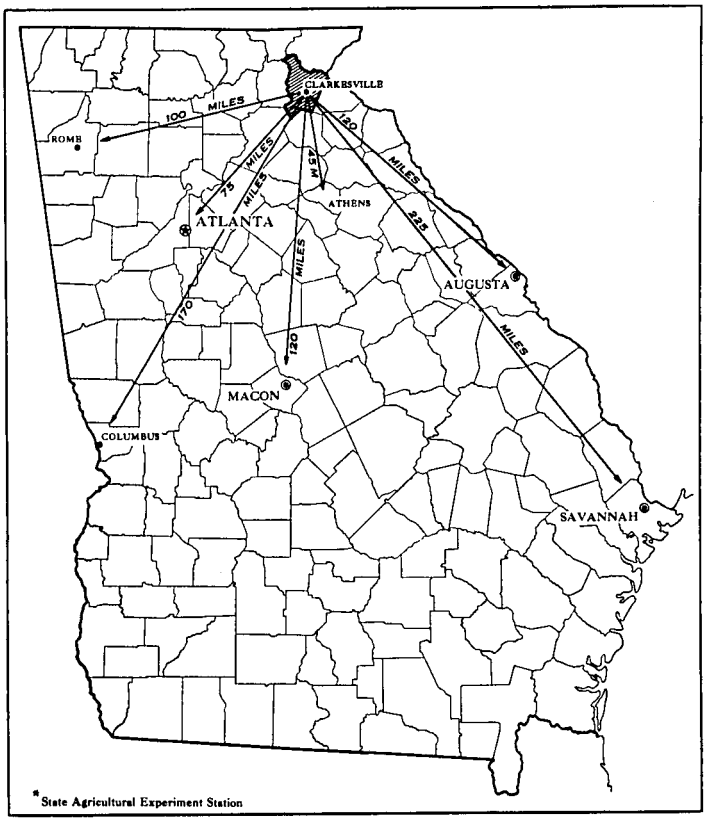

Figure 1.—**Location of Habersham County in Georgia. The State Agricultural Experiment Station is at Athens.**

mild and humid. Since early settlement, the county has been mainly agricultural. Corn, legumes, small grains, truck crops, and sorghum, including grain sorghum, are the main crops. Cotton was once the chief cash crop but is now grown on only a small acreage. Poultry, especially broilers, is the leading source of farm income. About 78 percent of the county is wooded.

The chief soils in most of the county are the well-drained, gently sloping to steep Cecil soils and the similar but more micaceous Madison soils. Soils of both of these series have a subsoil of red clay loam that is prominent wherever the original surface soil has been thinned or removed through erosion. The Cecil and Madison soils make up about two-thirds of the county.

In the Blue Ridge Mountains of the northwestern tip of the county, steep soils of the Porters and Ashe series are dominant. Porters soils are brown, only moderately deep, and generally steep. Ashe soils consist mostly of weathered rock.

Soils formed from water-laid materials lie along the streams, and there are several different soils of minor extent in all the upland areas. Soil patterns are described in the section "General Soil Map." Each kind of soil is shown on the large soil map and is described in the section "Descriptions of Soils."

How Soils are Named, Mapped, and Classified

Soil scientists made this survey to learn what kinds of soils are in Habersham County, where they are located, and how they can be used.

They went into the county knowing they likely would find many soils they had already seen, and perhaps some they had not. As they traveled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug and bored many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down to the rock material that has not been changed much by leaching or by roots of plants.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to uniform procedures. To use this report efficiently, it is necessary to know the kinds of groupings most used in a local soil classification.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the

soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Cecil and Habersham, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in natural characteristics.

Many soil series contain soils that are alike except for texture of their surface layer. According to this difference in texture, separations called soil types are made. Within a series, all the soils having a surface layer of the same texture belong to one soil type. Cecil sandy loam and Cecil sandy clay loam are two soil types in the Cecil series. The difference in texture of their surface layers is apparent from their names.

Some soil types vary so much in slope, degree of erosion, number and size of stones, or some other feature affecting their use, that practical suggestions about their management could not be made if they were shown on the soil map as one unit. Such soil types are divided into soil phases. The name of a soil phase indicates a feature that affects management. For example, Cecil sandy loam, 2 to 6 percent slopes, eroded, is one of several phases of Cecil sandy loam, a soil type that, in this county, ranges from gently sloping to moderately steep.

After a fairly detailed guide for classifying and naming the soils had been worked out, the soil scientists drew soil boundaries on aerial photographs. They used these photos for their base map because they show woodlands, buildings, field borders, trees, and other detail that greatly help in drawing boundaries accurately. The soil map in the back of this report was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning management of farms and fields, a mapping unit is nearly equivalent to a soil type or a phase of a soil type. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil type or soil phase.

In preparing some detailed maps, the soil scientist has a problem of delineating areas where different kinds of soils are so intricately mixed, and so small in size, that it is not practical to show them separately on the map. Therefore, he shows this mixture of soils as one mapping unit and calls it a soil complex. Ordinarily, a soil complex is named for the major soil series in it, for example, Clifton-Davidson complex. Also, in most mapping, there are areas to be shown that are so rocky, so shallow, or so frequently worked by wind and water that they cannot be called soils. These areas are shown on a soil map like other mapping units, but they are given descriptive names, such as Alluvial land, wet, or Alluvial land, and are called land types rather than soils.

Only part of the soil survey was done when the soil scientist had named and described the soil series and mapping units, and had shown the location of the mapping units on the soil map. The mass of detailed information he had recorded then needed to be presented in different ways for different groups of users, among them farmers, managers of woodlands and rangelands, and engineers.

To do this efficiently, he had to consult with persons in other fields of work and jointly prepare with them groupings that would be of practical value to different users. Such groupings are the capability classes, subclasses, and units, designed primarily for those interested in producing the short-lived crops and tame pasture; woodland suitability groups, for those who need to manage wooded tracts; and the classifications used by engineers who build highways or structures to conserve soil and water.

General Soil Map

After study of the soils in a locality and the way they are arranged, it is possible to make a general map that shows several main patterns of soils, called soil associations. Such a map is the colored general soil map in the back of this report. Each association, as a rule, contains a few major soils and several minor soils, in a pattern that is characteristic, although not strictly uniform.

The soils within any one association are likely to differ greatly among themselves in some properties; for example, slope, depth, stoniness, or natural drainage. Thus, the general map does not show the kind of soil at any particular place, but a pattern that has in it several kinds of different soils.

The soil associations are named for the major soil series in them, but as already noted, soils of other series may also be present. The major soil series of one soil association may also be present in other associations, but in a different pattern.

The general map showing patterns of soils is useful to people who want a general idea of the soils, who want to compare different parts of a county, or who want to know the possible location of good-sized areas suitable for a certain kind of farming or other land use.

1. Porters-Ashe Association: Well-drained to somewhat excessively drained, steep and very steep soils on mountains and high ridges; derived from granite gneiss

This soil association makes up about 7 percent of the county. Porters loam and Porters-Ashe stony loams are dominant in the area, but the Cecil, Madison, Clifton, and Davidson soils also occur. The Porters and the Ashe soils are steep and shallow. They generally have a thin, dark-brown or dark reddish-brown subsoil, but this layer is missing in many places. Most of this soil association is stony. Only a few small parts have been cleared for cultivation, but the forests have been severely cut over. Most of the acreage consists of soils in capability units VIIe–1 and VII–2.

2. Madison-Halewood Association: Well-drained, moderately deep, gently sloping to steep soils on uplands; derived from quartz mica schist and mica schist

This soil association makes up almost 36 percent of the county. The Madison soils are dominant, and there is a considerable acreage of Halewood soils. Also in the area are smaller acreages of Altavista, Buncombe, Cecil, Colfax, Davidson, Lloyd, Masada, Roanoke, Watauga, and Wickham soils. The Madison soils have a highly mi-

caceous, reddish subsoil that is underlain by micaceous material. A large total acreage has been cleared and cultivated, but much of this has reverted to woodland. This soil association consists mainly of soils in capability units VIe–2 and VIIe–1, but some of it is made up of soils in classes II, III, and IV.

3. Cecil-Madison Association: Well-drained, moderately deep and deep, gently sloping to steep soils on ridgetops and side slopes; derived from gneiss and micaceous schist.

This soil association makes up about 43 percent of the county. The Cecil soils are dominant, and a fairly large part of the area is in Madison soils. Also in the soil area are Altavista, Buncombe, Colfax, Davidson, Lloyd, Masada, Roanoke, and Wickham soils. The Cecil soils have a subsoil of reddish sandy clay loam and clay loam to clay. A large total acreage has been cleared and cultivated, but much of this has reverted to woodland. Soils in capability units VIe–2 and VIIe–1 make up most of this soil association, but there is also a sizable acreage of soils in capability units IIIe–1 and IVe–1. Soils of units VIe–2 and VIIe–1 are wooded, and those of units IIIe–1 and IVe–1 are in cultivated crops or in pasture.

4. Clifton-Davidson Association: Well-drained, moderately shallow to moderately deep, moderately steep and steep soils on ridgetops and side slopes; derived from basic rocks

This soil association makes up less than 1 percent of the county. The Clifton and Davidson soils are dominant. These soils are generally shallow and stony and, in places, are moderately deep over basic rock material. Most of this soil association consists of soils in capability units VIIe–1 and VIIe–2.

5. Congaree-Chewacla-Buncombe Association: Well-drained to somewhat poorly drained soils on flood plains.

This soil association covers more than 6 percent of the county. The Congaree, Chewacla, and Buncombe soils are dominant, and the Wehadkee soils make up a small part of the area. Most of the soils are well drained, though drainage ranges from excessive to poor and the soil association is subject to flooding. Soils in capability units IIw–2 and IIIw–2 make up the greater part of this association and are cultivated or in pasture.

6. Louisburg-Habersham Association: Well-drained to somewhat excessively drained soils on sloping ridgetops and steep side slopes; derived from quartzite and quartzitic gneiss, granite, and schist.

This soil association covers about 2 percent of the county. Dominant in the area are the Louisburg and Habersham soils. These soils formed in material weathered from quartzite and quartzitic gneiss, granite, and schist. In many places they are stony. They have a coarse-textured surface soil and, in places, lack a developed subsoil. Forests in this soil association have been severely cut over, and a small acreage has been cleared and is cultivated. Most of the soil association consists of soils in capability units IIIe–2, VIe–3, and VIIe–2.

7. Louisa-Chandler Association: Somewhat excessively drained, shallow soils on narrow, high ridgetops and moderately steep to very steep side slopes; derived from mica schist, schist, and micaceous gneiss.

This soil association makes up about 5 percent of the county. The Louisa soils are dominant, and the Chandler soils make up a small part of the association. The soils are shallow and are underlain by micaceous parent material. They have little or no development of a B horizon. Only a few sizable parts of this soil association have been cleared, but the forests have been heavily cut over. Soils in capability unit VIIe–2 make up most of the area.

Descriptions of Soils

In this section the soils of Habersham County are described. The soil series are arranged in alphabetic order, and for each series, characteristics are described that are common to all soils in the series.

The first soil described in each series is the one considered most typical of the series, and variations from this soil that occur in the other soils in the series are stated in the text. Differences in slope and erosion, if any, are part of the soil name. The section "Formation and Classification of Soils" contains a brief but more technical description of each series in the county and a detailed description of a soil profile representative of the series.

The approximate acreage and proportionate extent of the soils are given in table 1. The location and distribution of the soils are shown on the soil map at the back of the report. Defined in the Glossary are terms of consistence, such as friable; of structure, such as granular; and other terms that may not be familiar to some readers.

Alluvial Land

Alluvial land consists of stratified alluvium that has been deposited recently on level flood plains and is of varied drainage. Deposits are likely to change frequently because the streams overflow and bring in sediments. In most places, however, the soil materials have remained in place long enough for plants to become established. Alluvial land varies in texture but is essentially sandy throughout its profile. The deposits have not been in place long enough for soil horizons to develop.

Alluvial land (0 to 2 percent slopes) (Alm).—This land type consists of well drained and moderately well drained, stratified alluvium that recently has been deposited on level flood plains. It is of varied texture but is mostly sandy and commonly has small mica flakes through the profile. Included with this land along streambanks are narrow strips of the sandy, excessively drained Buncombe soils. A few poorly drained spots are also included.

Alluvial land in this county is strongly acid, is low in fertility, and contains little organic matter. Tilth is generally good, and the root zone is thick. Surface runoff is slow, internal drainage is medium, and the water-supplying capacity is moderate. Though this land is not susceptible to erosion, scouring and flooding are hazards.

Alluvial land is well suited to intensive use and may be planted to row crops every year. Except late in summer, moisture is normally adequate. This land is well suited to irrigation because a supply of water is generally nearby and slopes, infiltration, permeability, and tilth are favorable. The range of plants suited to Alluvial land is somewhat limited by the moderate risk of seasonal overflow. Most of the acreage is cultivated or in pasture. (Capability unit IIw–2; woodland suitability group 1.)

TABLE 1.—*Approximate acreage and proportionate extent of the soils mapped*

Soil	Area	Extent	Soil	Area	Extent
	Acres	*Percent*		*Acres*	*Percent*
Alluvial land	781	0. 4	Halewood fine sandy loam, 6 to 10 percent slopes, eroded	539	0. 3
Alluvial land, wet	3, 333	1. 8	Halewood fine sandy loam, 10 to 15 percent slopes	404	. 2
Altavista fine sandy loam, 0 to 2 percent slopes	289	. 2	Halewood fine sandy loam, 15 to 25 percent slopes	419	. 2
Altavista fine sandy loam, 2 to 6 percent slopes	423	. 2	Halewood fine sandy loam, 25 to 60 percent slopes	1, 924	1. 1
Altavista fine sandy loam, 2 to 6 percent slopes, eroded	680	. 4	Hiwassee fine sandy loam, 2 to 6 percent slopes eroded	308	. 2
Appling sandy loam, 2 to 6 percent slopes, eroded	290	. 2	Hiwassee fine sandy loam, 6 to 10 percent slopes, eroded	850	. 5
Appling sandy loam, 6 to 10 percent slopes, eroded	557	. 3	Hiwassee fine sandy loam, 10 to 15 percent slopes, eroded	624	. 3
Augusta silt loam, 0 to 2 percent slopes	289	. 2	Hiwassee fine sandy clay loam, 6 to 10 percent slopes, severely eroded	332	. 2
Augusta silt loam, 2 to 6 percent slopes	440	. 2	Hiwassee fine sandy clay loam, 10 to 15 percent slopes, severely eroded	395	. 2
Buncombe loamy sands	841	. 5	Lloyd loam, 2 to 6 percent slopes, eroded	496	. 3
Cecil sandy loam, 2 to 6 percent slopes, eroded	1, 432	. 8	Lloyd loam, 6 to 10 percent slopes	156	. 1
Cecil sandy loam, 6 to 10 percent slopes	1, 300	. 7	Lloyd loam, 6 to 10 percent slopes, eroded	835	. 5
Cecil sandy loam, 6 to 10 percent slopes, eroded	5, 341	2. 9	Lloyd loam, 10 to 15 percent slopes, eroded	794	. 4
Cecil sandy loam, 10 to 15 percent slopes	4, 799	2. 6	Lloyd clay loam, 6 to 10 percent slopes, severely eroded	866	. 5
Cecil sandy loam, 10 to 15 percent slopes, eroded	3, 281	1. 8	Lloyd clay loam, 10 to 15 percent slopes, severely eroded	958	. 5
Cecil sandy loam, 15 to 25 percent slopes	19, 556	10. 8	Louisa fine sandy loam, 15 to 25 percent slopes	2, 033	1. 1
Cecil sandy loam, 15 to 25 percent slopes, eroded	5, 746	3. 2	Louisa fine sandy loam, 25 to 60 percent slopes	4, 646	2. 6
Cecil sandy loam, thin solum, 25 to 60 percent slopes	7, 789	4. 3	Louisa fine sandy loam, 60 to 90 percent slopes	836	. 5
Cecil sandy clay loam, 6 to 10 percent slopes, severely eroded	3, 072	1. 7	Louisa fine sandy clay loam, 15 to 25 percent slopes, severely eroded	406	. 2
Cecil sandy clay loam, 10 to 15 percent slopes, severely eroded	4, 715	2. 6	Louisburg sandy loam, 10 to 15 percent slopes, eroded	388	. 2
Cecil sandy clay loam, 15 to 25 percent slopes, severely eroded	4, 175	2. 3	Louisburg sandy loam, 15 to 25 percent slopes	130	. 1
Cecil stony sandy loam, 15 to 25 percent slopes	2, 952	1. 6	Louisburg-Habersham stony fine sandy loams, 10 to 15 percent slopes	395	. 2
Cecil stony sandy loam, thin solum, 25 to 60 percent slopes	5, 471	3. 0	Louisburg-Habersham stony fine sandy loams, 10 to 15 percent slopes, severely eroded	513	. 3
Chandler loam, 15 to 25 percent slopes	119	. 1	Louisburg-Habersham stony fine sandy loams, 15 to 25 percent slopes	655	. 4
Chandler loam, 25 to 60 percent slopes	500	. 3	Louisburg-Habersham stony fine sandy loams, 25 to 60 percent slopes	215	. 1
Chandler loam, 60 to 95 percent slopes	158	. 1	Madison fine sandy loam, 2 to 6 percent slopes, eroded	1, 024	. 6
Chewacla fine sandy loam	364	. 2	Madison fine sandy loam, 6 to 10 percent slopes	1, 724	. 9
Chewacla silt loam	3, 829	2. 1	Madison fine sandy loam, 6 to 10 percent, slopes eroded	6, 030	3. 3
Clifton-Davidson complex, 15 to 25 percent slopes	202	. 1	Madison fine sandy loam, 10 to 15 percent slopes	3, 711	2. 0
Clifton-Davidson complex, 25 to 60 percent slopes	309	. 2	Madison fine sandy loam, 10 to 15 percent slopes, eroded	4, 161	2. 3
Clifton-Davidson stony complex, 15 to 25 percent slopes	193	. 1	Madison fine sandy loam, 15 to 25 percent slopes	9, 983	5. 5
Clifton-Davidson stony complex, 25 to 60 percent slopes	617	. 3	Madison fine sandy loam, 15 to 25 percent slopes, eroded	7, 181	4. 0
Clifton-Davidson stony complex, 60 to 90 percent slopes	151	. 1	Madison fine sandy loam, 25 to 60 percent slopes	2, 392	1. 3
Colfax sandy loam, 2 to 6 percent slopes	493	. 3	Madison fine sandy clay loam, 2 to 6 percent slopes, severely eroded	154	. 1
Colfax sandy loam, 6 to 10 percent slopes, eroded	166	. 1	Madison fine sandy clay loam, 6 to 10 percent slopes, severely eroded	3, 535	1. 9
Congaree silt loam	1, 217	. 7	Madison fine sandy clay loam, 6 to 10 percent slopes, very severely eroded	231	. 1
Congaree soils, local alluvium	1, 188	. 7	Madison fine sandy clay loam, 10 to 15 percent slopes, severely eroded	4, 639	2. 6
Davidson loam, thin solum, 10 to 15 percent slopes, eroded	236	. 1	Madison fine sandy clay loam, 10 to 15 percent slopes, very severely eroded	492	. 3
Davidson loam, thin solum, 15 to 25 percent slopes	383	. 2	Madison fine sandy clay loam, 15 to 25 percent slopes, severely eroded	4, 009	2. 2
Davidson loam, thin solum, 25 to 60 percent slopes	374	. 2	Madison fine sandy clay loam, 15 to 25 percent slopes, very severely eroded	192	. 1
Habersham fine sandy loam, 2 to 6 percent slopes, eroded	100	. 1			
Habersham fine sandy loam, 6 to 10 percent slopes	282	. 2			
Habersham fine sandy loam, 6 to 10 percent slopes, eroded	414	. 2			
Habersham fine sandy loam, 10 to 15 percent slopes, eroded	696	. 4			
Halewood fine sandy loam, 2 to 6 percent slopes, eroded	156	. 1			
Halewood fine sandy loam, 6 to 10 percent slopes	97	(1)			

[1] Less than 0.1 percent.

TABLE 1.—*Approximate acreage and proportionate extent of the soils mapped*—Continued

Soil	Area	Extent	Soil	Area	Extent
	Acres	*Percent*		*Acres*	*Percent*
Masada fine sandy loam, 2 to 6 percent slopes, eroded	264	.1	Roanoke fine sandy loam	287	.2
Masada fine sandy loam, 6 to 10 percent slopes, eroded	638	.3	Tusquitee loam, 2 to 6 percent slopes	385	.2
Masada fine sandy loam, 6 to 10 percent slopes, severely eroded	325	.2	Tusquitee loam, 6 to 10 percent slopes	826	.5
Musella stony clay loam, 10 to 15 percent slopes, severely eroded	106	.1	Tusquitee loam, 6 to 10 percent slopes, eroded	739	.4
Musella stony clay loam, 15 to 25 percent slopes, eroded	1,105	.6	Tusquitee loam, 10 to 15 percent slopes	940	.5
Porters loam, 10 to 15 percent slopes	279	.2	Tusquitee loam, 10 to 15 percent slopes, eroded	882	.5
Porters loam, 15 to 25 percent slopes	926	.5	Tusquitee stony loam, 6 to 10 percent slopes	191	.1
Porters loam, 25 to 60 percent slopes	4,119	2.3	Tusquitee stony loam, 10 to 15 percent slopes	662	.4
Porters loam, 60 to 80 percent slopes	1,398	.8	Watauga loam, 15 to 25 percent slopes	305	.2
Porters-Ashe stony loams, 15 to 25 percent slopes	104	.1	Watauga loam, 25 to 60 percent slopes	234	.1
Porters-Ashe stony loams, 25 to 60 percent slopes	1,679	.9	Wehadkee silt loam	745	.4
Porters-Ashe stony loams, 60 to 95 percent slopes	2,208	1.2	Wickham fine sandy loam, 2 to 6 percent slopes, eroded	613	.3
			Wickham fine sandy loam, 6 to 10 percent slopes, eroded	781	.4
			Wickham clay loam, 6 to 10 percent slopes, severely eroded	457	.2
			Water	551	.3
			Total	181,120	100.0

Alluvial land, wet (Avp).—This nearly level land consists of recent alluvium that is susceptible to frequent overflow. It is of varied but dominantly sandy texture. The range of crops suited to this land is limited by the overflow hazard, slow surface runoff, slow internal drainage, and a high water table.

This land is best suited to pasture and trees, but if it is adequately drained, it can be used for corn or other cultivated crops. Most of the acreage is in trees or in scrub willows or alders. (Capability unit IIIw–2; woodland suitability group 2.)

Altavista Series

The Altavista series consists of level and gently sloping, moderately well drained, strongly acid soils on low stream terraces. These soils have formed in old alluvium. The surface layer is light olive-brown fine sandy loam, about 9 inches thick. It is underlain by yellow, mottled clay loam.

The Altavista soils occur with the Wickham, Augusta, and Roanoke soils. They are less well drained than the Wickham soils, and their subsoil is yellow instead of red. They are better drained and less mottled than the Augusta and the Roanoke soils.

In this county the Altavista soils occur in small, scattered areas along streams. The native vegetation was hardwoods, mainly oak, hickory, sweetgum, poplar, and maple, but many areas have been cleared and are cultivated. Some cleared areas have reverted to Virginia pine, shortleaf pine, alder, and poplar.

Corn and pasture are well suited to these soils and generally produce moderate to high yields. Because drainage is impeded in the lower part of the subsoil, alfalfa and other deep-rooted crops that are sensitive to wetness do not thrive. Most of the acreage of these soils is wooded, but some is cultivated or in pasture.

Altavista fine sandy loam, 2 to 6 percent slopes (AkB).—This soil is moderately well drained and strongly acid. It has formed in old alluvium on stream terraces. The major horizons in the profile are—

0 to 9 inches, light olive-brown, very friable fine sandy loam.
9 to 33 inches, yellow, friable clay loam mottled in the lower part; moderate, subangular blocky structure.
33 to 36 inches +, yellow clay loam mottled with yellowish red and gray.

The surface layer ranges from light grayish brown to brown. The subsoil is light red to yellow and is mottled with gray. Included with this soil are areas totaling about 18 acres that have a surface layer of dark-brown loam, about 10 inches thick. Under this layer is strong-brown to light yellowish-brown silty clay loam or clay loam.

Altavista fine sandy loam, 2 to 6 percent slopes, is generally in good tilth and has a thick root zone. Surface runoff is slow, and the water-supplying capacity is moderate. Erosion is only a slight hazard.

This soil responds well to good management and is moderately productive. The impeded drainage in the lower part of the subsoil limits the range of suitable crops, but the soil is well suited to corn, most legumes, hay, pasture, and trees. (Capability unit IIe–2; woodland suitability group 4B.)

Altavista fine sandy loam, 0 to 2 percent slopes (AkA).—This moderately well drained soil has a surface layer of light olive-brown to brownish-yellow fine sandy loam, about 9 inches thick. The subsoil is yellow clay loam that is mottled with gray in the lower part.

Included with this soil are areas totaling about 34 acres that have a dark-brown loam surface layer, about 11 inches thick. Underlying this is strong-brown to light yellowish-brown silty clay loam.

The tilth of this soil is generally good, and the root zone is thick. The water-supplying capacity is moderate.

Surface runoff is very slow, and the erosion hazard is slight.

This soil is well suited to corn, hay, pasture, and trees, but most of the acreage is in pasture. If winter cover crops are grown, this soil may be planted to row crops every year. (Capability unit I–2; woodland suitability group 4B.)

Altavista fine sandy loam, 2 to 6 percent slopes, eroded (AkB2).—This moderately well drained soil is yellower than the uneroded Altavista soils. Its surface soil is about 5 inches thick and is thinner than that in the uneroded soils. The subsoil is yellow clay loam that is mottled with gray in the lower part. Small gullies have formed in some places.

This soil is generally in good tilth, has a moderately thick root zone, and is moderately productive. The water-supplying capacity is moderate, and surface runoff is slow.

Corn, most legumes, hay, pasture, and trees are well suited to this soil, but the range of suitable plants is limited, in places, by impeded drainage in the lower part of the profile. Most of this soil is in pasture. (Capability unit IIe–2; woodland suitability group 4B.)

Appling Series

The Appling series consists of gently sloping and sloping, well-drained, acid soils that have developed on low uplands. These soils have formed in materials weathered from gneiss and granitoid gneiss that, in places, are mixed with schist. The yellowish-brown surface layer is sandy loam, about 6 to 9 inches thick. It is underlain by yellowish-brown to yellowish-red sandy clay loam to sandy clay that is normally mottled at about 30 inches from the surface.

These soils occur with the Cecil, Madison, Colfax, and Halewood soils. They are not so red as the Cecil and Madison soils and are better drained and much less mottled than the Colfax soils. They do not contain so much mica as the higher lying Halewood soils.

In this county these soils occur in small, scattered areas in the southern part. The native vegetation was hardwoods, mainly oak, hickory, chestnut, poplar, gum, and maple. Many areas have been cleared and are cultivated, but some of these have reverted to Virginia pine and shortleaf pine. Though most of the acreage is wooded, some of it is cultivated or in pasture.

Appling sandy loam, 2 to 6 percent slopes, eroded (AmB2).—This soil is well drained and strongly acid. It has developed on uplands, chiefly in material weathered from gneiss and granitoid gneiss. The major horizons in the profile are—

0 to 9 inches, yellowish-brown, very friable sandy loam.
9 to 33 inches, yellowish-brown to yellowish-red or reddish-brown, friable sandy clay loam to sandy clay, which is mottled below a depth of 30 inches; moderate, subangular blocky structure.
33 to 40 inches +, brownish-yellow, mottled sandy clay loam.

The surface layer of this soil ranges from yellowish brown to yellow. The subsoil ranges from yellowish brown to yellowish red in color and from sandy clay loam to sandy clay in texture.

This soil is generally in good tilth, and its root zone is moderately thick to thick. Surface runoff and the water-supplying capacity are moderate. Erosion is a slight to moderate hazard in cultivated fields. This soil is strongly acid throughout the profile. It responds well to good management and produces moderate yields of corn, legumes, hay, pasture, and other locally grown crops. Most of this soil is in pasture. (Capability unit IIe–2; woodland suitability group 4B.)

Appling sandy loam, 6 to 10 percent slopes, eroded (AmC2).—This well-drained soil has a slightly thinner surface layer than Appling sandy loam, 2 to 6 percent slopes, eroded. The surface layer is yellowish-brown to yellowish-red sandy loam, about 5 to 8 inches thick. It is underlain by yellowish-red to reddish-brown sandy clay loam to sandy clay. A few shallow gullies have formed in places.

This soil has a moderately thick to thick root zone and can be kept in good tilth. The water-supplying capacity is moderate, and surface runoff is medium.

This soil responds well to good management, but cultivated fields are susceptible to erosion. Though corn, legumes, hay, pasture, and trees are well suited, most of this soil is in pasture. Yields are moderate. (Capability unit IIIe–2; woodland suitability group 4B.)

Augusta Series

The Augusta series consists of level and gently sloping, somewhat poorly drained, strongly acid soils. These soils have formed in alluvium on low terraces. Their surface layer is dark grayish-brown silt loam and is about 2 inches thick. It is underlain by a layer that is 18 inches thick and is light olive brown to light gray mottled with yellowish red and light brownish gray.

These soils are the somewhat poorly drained members of the Wickham-Altavista-Augusta-Roanoke catena. They are not so well developed or so well drained as are the Altavista soils. They differ in color from the red Wickham soils, the brownish-yellow to yellow Altavista soils, and the greenish-gray Roanoke soils. They are better drained than the Roanoke soils.

In Habersham County Augusta soils are scattered in small areas along the small streams. The native vegetation consisted of hardwoods, mainly oak and hickory, and some chestnut, poplar, gum, and maple. Many areas have been cleared and cultivated, but some of these are reverting to alder, oak, gum, hickory, and poplar.

Most of the acreage of these soils is in trees, but a few areas are in pasture. Tall fescue and ladino clover are fairly suitable pasture grasses and produce moderate to low yields. Because internal drainage is slow, alfalfa and other plants sensitive to wetness do not thrive. These soils are generally deficient in lime, nitrogen, phosphorus, and potassium.

Augusta silt loam, 0 to 2 percent slopes (AwA).—This is a somewhat poorly drained, medium-textured, strongly acid soil on low terraces. The major horizons in the profile are:

0 to 2 inches, dark grayish-brown, very friable silt loam.
2 to 20 inches, light olive-brown, mottled, friable silt loam with weak, subangular blocky structure.
20 to 36 inches, light-gray silt loam prominently mottled with yellowish red.

The surface soil ranges from light grayish brown to dark gray. The light-colored, mottled subsoil is under-

lain by slowly permeable, light-gray, highly mottled material.

Included with this soil are small, poorly drained areas that resemble the Roanoke soils but are capped with a thin layer of fairly permeable overwash.

This soil is very strongly acid throughout the profile. It generally produces low yields but responds fairly well to good management. Surface runoff is very slow, and erosion is only a slight hazard. The water-supplying capacity is moderate. Poor drainage, generally poor tilth, and a somewhat shallow root zone restrict the kinds of plants that can be grown.

Unless properly drained, this soil is suited to few of the commonly grown crops. Use for hay, pasture, and trees is best. (Capability unit IIIw–3; woodland suitability group 2.)

Augusta silt loam, 2 to 6 percent slopes (AwB).—This somewhat poorly drained soil has a moderately permeable surface layer of dark grayish-brown silt loam, about 2 inches thick. The subsoil is light olive-brown, dense, slowly permeable silt loam.

This soil is generally in poor tilth, and the root zone is shallow to moderately deep. The water-supplying capacity is moderate, and surface runoff is slow.

Excessive moisture restricts the kinds of plants that can be grown. This soil is best used for shallow-rooted legumes, hay, pasture, and trees. Yields are low. Most of the acreage is in pasture. (Capability unit IIIw–3; woodland suitability group 2.)

Buncombe Series

The Buncombe series consists of sandy, somewhat excessively drained soils that are strongly acid. These soils have formed in recent alluvium on flood plains. Their surface layer of light-brown or olive-brown loamy sand is underlain by yellowish-brown to gray loamy sand. Slopes range from 0 to 6 percent but are mostly about 2 to 3 percent.

These soils occur with the Congaree and Chewacla soils but are much sandier than those soils.

The Buncombe soils in this county are in small areas adjacent to permanent streams. The native vegetation was hardwoods, mainly oak, hickory, ash, maple, poplar, and some gum. Many areas have been cleared and are cultivated. Some abandoned areas have reverted to alder, Virginia pine, and shortleaf pine. The main use is pasture, but a few areas are in cultivated crops, mainly corn. If adequately fertilized, these soils are suited to corn and pasture. Yields generally are moderate to low.

Buncombe loamy sands (0 to 6 percent slopes) (Bfs).—These somewhat excessively drained, sandy soils are on bottom lands and are scoured and overwashed during floods. The major horizons in the profile are—

0 to 6 inches, light olive-brown, loose to very friable loamy sand.
6 to 48 inches, yellowish-brown, loose loamy sand.

The surface layer is light gray in places where the soil material was recently deposited. It has been stained dark gray by organic matter in some wooded areas. Mica flakes are common throughout some profiles.

These soils are strongly acid, are low in natural fertility, and contain little organic matter. They are generally in good tilth and have a thick root zone. Surface runoff is very slow, and the water-supplying capacity is low. The range of suitable plants is limited by droughtiness, but corn, hay, pasture, and trees grow moderately well. Most of the acreage is in pasture. (Capability unit IIIs–1; woodland suitability group 14.)

Cecil Series

The Cecil series consists of gently sloping to steep, well-drained, strongly acid soils. These soils have formed in material weathered mainly from gneiss, which in places is mixed with schist, granite, quartzite, and basic material. Where there is little erosion, the surface layer is reddish-brown to yellowish-brown sandy loam, 9 to 16 inches thick. In most places the subsoil is red clay loam.

These soils occur with the Porters, Madison, Appling, Colfax, and Halewood soils. They are not so highly micaceous as the Madison soils, and their subsoil is redder and less mottled than that in the Appling and Halewood soils. They are much better drained than the Colfax soils. Their horizons are more distinct and the profiles are deeper than those of the Porters soils.

The Cecil soils are extensive in Habersham County. They originally were covered with hardwoods, mainly oak, hickory, chestnut, poplar, gum, and maple. Many areas have been cleared and cultivated. Some fields have been abandoned and have reverted to Virginia pine and shortleaf pine. These soils are used chiefly for trees, but many areas are cultivated or in pasture.

Cecil sandy loam, 6 to 10 percent slopes (CYC).—This is a well-drained, strongly acid soil on uplands. The major horizons in the profile are—

0 to 16 inches, reddish-brown, very friable sandy loam.
16 to 36 inches, red, firm clay loam with moderate, fine and medium, angular blocky structure.
36 to 48 inches, red sandy clay loam.

The surface layer of this soil is grayish brown to reddish brown. The subsoil ranges from clay to clay loam and is red, except where the parent material has weathered partly from rocks other than gneiss. If weathered basic rocks make up part of the parent material, the subsoil is a darker red. It is a paler red and the sand particles are coarser if the parent material is partly weathered quartzite. Small included areas contain a large proportion of sand.

This soil is generally in good tilth and has a thick root zone. The water-supplying capacity is moderate, and surface runoff is slow to medium.

The soil responds well to good management and is suited to a wide range of crops. Much of the acreage, however, is in trees. With good management, the soil is well suited to cultivation, but erosion is a moderate hazard in cultivated fields. (Capability unit IIIe–1; woodland suitability group 4A.)

Cecil sandy loam, 10 to 15 percent slopes (CYD).—This well-drained soil has a yellowish-brown to yellowish-red sandy loam surface layer, about 10 inches thick. The subsoil is red sandy clay loam and clay loam, about 18 inches thick.

This soil has a moderately thick root zone and is generally in fair tilth. The water-supplying capacity is moderate to high, and surface runoff is medium.

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This soil responds well to good management, but the strong slope causes a severe erosion hazard. Most of the soil is in trees. Hay crops, tree fruits, pasture, and trees are well suited and produce high yelds. The most intensive safe use for all areas of this soil is probably that of growing suitable legumes and grasses for permanent pasture. Under very careful management, however, the less sloping parts can be used for row crops 1 year in 5 or 6. (Capability unit IVe–1; woodland suitability group 4A.)

Cecil sandy loam, 15 to 25 percent slopes (CYE).—This soil has stronger slopes and a thinner surface layer than Cecil sandy loam, 6 to 10 percent slopes. The surface layer is yellowish-brown to yellowish-red sandy loam and is about 10 inches thick. The subsoil, about 18 inches thick, is red clay loam.

This soil has a moderately thick root zone and is generally in fair tilth. The water-supplying capacity is moderate to high, and surface runoff is medium.

This soil responds fairly well to good management, but it is too steep and too erosive for cultivation. It is best suited to hay, to trees, and to legumes and grasses grown for permanent pasture. Most of the soil is in trees. (Capability unit VIe–2; woodland suitability group 5.)

Cecil sandy loam, thin solum, 25 to 60 percent slopes (CuF).—The steep slopes and thin surface layer distinguish this well-drained soil from Cecil sandy loam, 6 to 10 percent slopes. The surface layer is yellowish-brown to yellowish-red sandy loam, about 8 inches thick. The subsoil of red clay loam and sandy clay loam is about 18 inches thick.

In many places the root zone in this soil is moderately thick, but in some places it is thin. Tilth is generally poor. The water-supplying capacity and surface runoff are moderate.

This soil responds fairly well to management, but it is too steep for cultivation. The erosion hazard is so great that the soil should not be left bare at any time. All of the soil is in woods, its best use. Yields of wood products are moderate. (Capability unit VIIe–1; woodland suitability group 12.)

Cecil sandy loam, 2 to 6 percent slopes eroded (CYB2).—The surface layer of this soil is reddish-brown sandy loam, about 12 inches thick. It is underlain by a red subsoil, which is a clay to clay loam and is about 20 inches thick. A few shallow gullies have formed in places, and further erosion is a slight to moderate hazard in cultivated fields.

Included with this soil are small, widely scattered, severely eroded areas that total about 60 acres. These inclusions have a reddish sandy clay loam surface layer.

This soil has a thick root zone and generally is in good tilth. The water-supplying capacity is moderate, and surface runoff is medium.

The soil responds well to good management. It is suited to almost all locally grown crops but must be managed carefully to control erosion. Yields are high. Most of this soil is cultivated or in pasture. (Capability unit IIe–1; woodland suitability group 4A.)

Cecil sandy loam, 6 to 10 percent slopes, eroded (CYC2).—The surface layer of this soil is reddish-brown sandy loam, about 13 inches thick. It is underlain by red sandy clay loam to clay loam, about 20 inches thick. A few shallow gullies have formed in places, and erosion is a moderate hazard.

This soil is generally in fair tilth, and its root zone is thick. The water-supplying capacity is moderate, and surface runoff is medium.

This soil responds well to good management and is suited to almost all of the locally grown row crops, and to tree fruits, hay, pasture, and trees. Yields are high. Most of the soil is in pasture. (Capability unit IIIe–1; woodland suitability group 4A.)

Cecil sandy loam, 10 to 15 percent slopes, eroded (CYD2).—This strongly sloping soil has a thinner surface layer than Cecil sandy loam, 6 to 10 percent slopes. The surface layer is yellowish-red to reddish-brown sandy loam, about 5 inches thick. It is underlain by a subsoil of red clay loam and sandy clay loam, about 18 inches thick. A few gullies have formed in places, and further erosion is a severe hazard.

This soil has a moderately thick root zone and is generally in fair tilth. The water-supplying capacity is moderate, and surface runoff is rapid.

This soil responds fairly well to good management. It is suited to a wide range of plants but cannot be cultivated frequently. Because it is strongly sloping and is likely to erode, this soil should not be planted to cultivated crops more than 1 year in 5 or 6. The best uses are for hay, trees, and legumes and grasses in permanent pasture. Most of this soil is in pasture. (Capability unit IVe–1; woodland suitability group 4A.)

Cecil sandy loam, 15 to 25 percent slopes, eroded (CYE2).—This moderately steep soil is generally thinner than the Cecil soils on milder slopes. Its surface layer is yellowish-red to reddish-brown sandy loam, about 6 inches thick. The subsoil is about 18 inches thick and consists of red sandy clay loam and clay loam. A few gullies have formed in some areas, and further erosion is likely.

This soil has a moderately thick root zone and is generally in fair tilth. The water-supplying capacity is moderate, and surface runoff is medium to rapid.

Most of this soil is in trees. It responds fairly well to good management, but the strong slopes and the severe hazard of erosion prevent cultivation. The best uses are for perennial vegetation and trees. (Capability unit VIe–2; woodland suitability group 5.)

Cecil sandy clay loam, 6 to 10 percent slopes, severely eroded (CZC3).—The surface layer of this soil is red to reddish-brown sandy clay loam that is only about 3 to 5 inches thick. The subsoil, 16 to 20 inches thick, is red clay loam and is underlain by decomposed rock. Most, or all, of the original surface soil and, in places, some of the upper subsoil have been lost through erosion. Many small gullies have formed. Some gullies are too deep to cross with farm machinery, and many are getting larger. A few small, very severely eroded areas are included with this soil.

The soil has a moderately thick root zone, but tilth is generally poor. The water-supplying capacity is low, and surface runoff is medium to rapid. Erosion is a severe hazard.

Though this soil responds fairly well to good management, it is not suited to frequent cultivation. It is best suited to hay, to legumes and grasses in permanent pas-

ture, and to tree fruits and forest trees. Yields are moderate to low. Most of this soil is in trees or is reverting to trees. (Capability unit IVe–2; woodland suitability group 3.)

Cecil sandy clay loam, 10 to 15 percent slopes, severely eroded (CZD3).—The profile of this severely eroded soil is 15 to 20 inches thinner than that of Cecil sandy loam, 6 to 10 percent slopes. The surface layer is only about 3 inches thick and consists of red to reddish-brown sandy clay loam. The subsoil is red clay loam, 12 to 18 inches thick, and is underlain by decomposed rock. Most, or all, of the surface soil and, in places, some of the upper subsoil have washed away. Many small gullies have formed. Some gullies are too deep to be crossed by farm machinery, and many are getting larger. Many small, scattered, very severely eroded areas are included with this soil.

This soil has rapid surface runoff, and further erosion is likely. It holds only a small amount of water that plants can use, and tilth is generally poor.

This soil responds fairly well to good management, but its use is limited to trees and pasture. Most of the acreage is in trees. Yields of forest products are low to medium. (Capability unit VIe–2; woodland suitability group 3.)

Cecil sandy clay loam, 15 to 25 percent slopes, severely eroded (CZE3).—The surface layer of this severely eroded soil is only about 3 inches thick and consists of red to reddish-brown sandy clay loam. The subsoil is red clay loam, 10 to 16 inches thick, and is underlain by decomposed rock. Most, or all, of the original surface soil and, in many places, some of the upper subsoil have washed away. Many small gullies have formed, and some deep gullies cannot be crossed with farm machinery. Many of the gullies are getting larger. Many small, scattered areas of very severely eroded soil are included with this soil.

This soil is generally in poor tilth. It holds only a small amount of water that plants can use. Surface runoff is rapid and further erosion is likely.

Most of this soil is in trees or is reverting to them. It is too steep for cultivation. It is best suited to trees, but it can be seeded to pasture and grazed lightly. Yields are low. (Capability unit VIIe–1; woodland suitability group 11.)

Cecil stony sandy loam, 15 to 25 percent slopes (CaE).—The surface layer of this soil is yellowish-red stony sandy loam, about 4 inches thick. The subsoil, about 8 to 10 inches thick, is red sandy clay loam. It is underlain by a layer of weathered, coarse-grained gneiss and schist that is about 1 to 2 feet thick.

This soil is shallow and stony, is difficult to work, and responds poorly to management. Surface runoff is slow to medium, and the water-supplying capacity is moderate. Most of this soil is in trees. It is too steep and stony for cultivation and should be kept in trees. (Capability unit VIIs–1; woodland suitability group 7.)

Cecil stony sandy loam, thin solum, 25 to 60 percent slopes (CzF).—The surface layer of this soil is yellowish-red stony sandy loam, about 4 inches thick. The subsoil, about 8 inches thick, is red sandy clay loam. It is underlain by red, decomposed rock that weathered from coarse-grained gneiss and schist. This material extends 1 to 3 feet below the subsoil.

This soil has a shallow root zone and is difficult to work. Surface runoff is slow to medium, and the water-supplying capacity is moderate. The soil is too stony and steep for cultivation and responds poorly to management. It is suited to little other than trees, and most of it is wooded. (Capability unit VIIs–1; woodland suitability group 12.)

Chandler Series

The Chandler series consists of moderately steep to very steep, somewhat excessively drained soils that are highly micaceous and strongly acid. These soils have formed on mountain ridges and knobs in material weathered from mica schist and phyllite. Their thin, olive surface layer is loam, about 2 inches thick. Beneath this is yellowish-brown to dark yellowish-brown, loamy material that extends to mica schist at a varied depth.

The Chandler soils occur with the Louisa and Watauga soils but have paler, browner, and less distinct horizons than those soils. They are not so deep as the Watauga soils.

The native vegetation on these soils was hardwoods, mainly oak, hickory, chestnut, poplar, and to a lesser extent gum, maple, pine, sourwood, laurel, and rhododendron.

Most of the acreage in Habersham County is wooded. Many areas have been severely cut over but have reforested to blackjack oak and to Virginia, shortleaf, and pitch pines. These trees generally produce moderate yields.

Chandler loam, 15 to 25 percent slopes (CCE).—This is a somewhat excessively drained, highly micaceous soil on mountains. The major horizons in the profile are—

0 to 2 inches, olive, very friable loam.
2 to 4 inches, yellowish-brown, very friable loam; ranges from 2 to 6 inches in thickness.
4 to 78 inches +, dark yellowish-brown to yellowish-red, loamy material; extends to horizonal beds of mica schist at a varied depth.

This soil is strongly acid, is very susceptible to erosion, and is generally in poor tilth. It has a thin root zone and holds only a small amount of water that plants can use. It responds poorly to management.

All of this soil is in trees. It is not suited to cultivation and is best used for trees and wildlife habitats. Yields of forest products are low. (Capability unit VIIe–2; woodland suitability group 10.)

Chandler loam, 25 to 60 percent slopes (CCF).—The surface layer of this somewhat excessively drained soil is loam, about 2 to 4 inches thick. It is underlain by dark yellowish-brown, loamy material that extends to beds of mica schist at a varied depth.

This soil is too steep for cultivation; the erosion hazard is so severe that continuous cover must be maintained. Tilth is generally poor, and the water-supplying capacity is low. The soil is suited to little other than trees, and it produces only low yields of forest products. (Capability unit VIIe–2; woodland suitability group 12.)

Chandler loam, 60 to 95 percent slopes (CCG).—The surface layer of this steep soil is about 2 to 4 inches thick. It is underlain by dark yellowish-brown, loamy material that extends to beds of mica schist at a varied depth. There is little water available to plants, and yields are low. This soil is too steep for cultivation and is suited

only to trees. (Capability unit VIIe–2; woodland suitability group 15.)

Chewacla Series

The Chewacla series consists of somewhat poorly drained, strongly acid soils that have developed in recent alluvium on flood plains. The surface layer of these soils is dark-brown to yellowish-brown fine sandy loam or silt loam. It is underlain by mottled silt loam. The slopes range from 0 to 2 percent but are mostly about 2 percent.

In most places these soils occur with the Congaree, Wehadkee, and Buncombe soils. They are not so well drained as the Congaree soils and are less deep to mottling. Chewacla soils are better drained than the Wehadkee soils, which are mottled near the surface. They are not so sandy as the droughty Buncombe soils.

The Chewacla soils in this county are in small areas adjacent to permanent streams. The native vegetation was hardwoods, mainly oak, hickory, poplar, gum, and maple, but most areas have been cleared and cultivated. Some cleared fields have been abandoned and have reverted to alder and willow.

Most of the acreage is in pasture, but a few areas are in corn or other cultivated crops. Where drainage is adequate, corn and pasture crops are well suited and generally produce moderate to high yields.

Chewacla silt loam (0 to 2 percent slopes) (Csl).—This is a somewhat poorly drained, strongly acid soil on bottom lands. It has a high water table and is likely to be scoured and to receive deposits during floods. The major horizons in the profile are—

0 to 18 inches, dark-brown, very friable silt loam mottled with yellowish brown in the lower part.
18 to 36 inches, dark-brown to dark grayish-brown, mottled, very friable silt loam.

This soil can be kept in good tilth, and it responds well to good management. It has a moderate to high water-supplying capacity. Few crops are suited, however, because drainage is somewhat poor, surface runoff is very slow, and the water table is often high. Drained fields are well suited to row crops, grain sorghum, and truck crops. Yields are moderate to high. Hay, pasture, and trees are best for the undrained areas. This soil can be cultivated frequently if it is properly drained and protected from overflow, but most of the acreage is in pasture. (Capability unit IIIw–2; woodland suitability group 2.)

Chewacla fine sandy loam (0 to 2 percent slopes) (Cfl).—This somewhat poorly drained soil on bottom lands is sandier throughout the profile than Chewacla silt loam. The major horizons in the profile are—

0 to 8 inches, yellowish-brown to brownish-yellow, very friable fine sandy loam.
8 to 20 inches +, olive, mottled fine sandy loam.

Mica flakes are common throughout the profile, and in some places thin lenses of loamy sand occur.

Like Chewacla silt loam, this is a productive soil. It is generally in good tilth, has a moderate to high water-supplying capacity, and responds well to management. Drained fields are suited to most locally grown row crops, grain sorghum, and truck crops. Areas not drained are best for hay, pasture, and trees. Most of this soil is in pasture. (Capability unit IIIw–2; woodland suitability group 2.)

Clifton Series

The Clifton series consists of moderately steep to very steep, well-drained soils. These soils have formed in material weathered from basic rock, chiefly hornblende schist and diorite. In most places they have a very dark grayish-brown loam surface layer, about 4 inches thick, that is underlain by yellowish-red clay loam to clay. Many areas are stony. The rocks are of various sizes and make up much of the material below a depth of 7 inches in the stony Clifton soils and below 22 inches in the nonstony ones.

In this county the Clifton soils are so intermingled with the Davidson soils that they cannot be mapped separately but are described as complexes. Though Davidson soils and Clifton soils have developed in material weathered from basic rock, the Davidson soils have a redder surface soil, a darker red subsoil, and, in general, a thicker profile than the Clifton soils.

The native vegetation on the Clifton soils was hardwoods, mainly chestnut, oak, hickory, poplar, gum, and maple. Many areas have been heavily cut over and burned, and a few of these have reverted to Virginia, pitch, and shortleaf pines. These soils are mainly in trees.

Clifton-Davidson complex, 15 to 25 percent slopes (CKE).—In the northwestern part of the county, the Clifton and Davidson soils are mapped together in this complex because they are so intermingled that it is not practical to map them separately. These soils are well drained and have formed in material weathered from basic rock. The Clifton soils, which make up about 70 percent of this mapping unit, have a very dark grayish-brown surface soil and a yellowish-red clay subsoil. These Clifton soils are on the steep and rough parts of slopes near the slope breaks. The Davidson soils have a dark reddish-brown surface soil and a dark-red to reddish-brown clay subsoil. They are near the head of draws and on the smooth slopes. The major horizons in the Clifton soils are—

0 to 4 inches, very dark grayish-brown, friable loam.
4 to 22 inches, reddish-brown to yellowish-red, friable clay loam to clay; weak, subangular blocky structure; rock fragments make up 2 to 10 percent of the layer.
22 to 34 inches +, undifferentiated soil material between rocks that vary in size and degree of disintegration.

The major horizons in the Davidson soils are—

0 to 5 inches, dark reddish-brown, very friable loam.
5 to 20 inches, dark-red, friable clay loam in the upper part; reddish-brown, firm clay with moderate, angular blocky structure in the lower part.
20 to 40 inches +, yellowish-red, mottled sandy clay loam.

The soils in Clifton-Davidson complex, 15 to 25 percent slopes, are strongly acid in the surface layer and in the subsoil. In most places the root zone is moderately thick, but in a few places it is thin. These soils are generally in fair tilth and respond fairly well to good management. Surface runoff is medium, and the water-supplying capacity is moderate.

These soils are too steep and too susceptible to erosion for cultivation. They are suited to only a few agricultural uses but, under good management, will produce fair yields of hay and pasture. Most of the acreage is wooded. (Capability unit VIe–2; woodland suitability group 5.)

Clifton-Davidson complex, 25 to 60 percent slopes (CKF).—This complex of soils is steeper than Clifton-

Davidson complex, 15 to 25 percent slopes. It cannot be cultivated, because the erosion hazard is too severe for the soils to be left bare. It is best suited to trees, and all of the acreage is wooded. (Capability unit VIIe–1; woodland suitability group 12.)

Clifton-Davidson stony complex, 15 to 25 percent slopes (CLE).—In the northwestern part of the county, the Clifton and Davidson soils occur in such an intricate pattern that they were mapped together in this one unit.

These well-drained stony soils formed in material weathered from basic rock. The Clifton soils are not so red as the Davidson soils and have a thinner and less distinct subsoil. Clifton soils and Davidson soils contain many rock fragments. The Clifton soils make up about 70 percent of the acreage and are on steep, rough slopes.

The major horizons in the Clifton soils are—

0 to 3 inches, dark yellowish-brown, friable stony loam.
3 to 7 inches, dark-brown to brown, friable clay loam with moderate, granular structure.
7 to 36 inches, strong-brown heavy clay loam between rocks that range from 4 to 12 inches in diameter and make up 70 percent of the horizon.

The major horizons in the Davidson soils are—

0 to 5 inches, dark reddish-brown, very friable stony loam.
5 to 18 inches, reddish-brown, friable to firm clay loam to clay with moderate, angular blocky structure.
18 to 30 inches, reddish-brown clay loam containing many fragments of basic rock.

The surface layer of Clifton-Davidson stony complex, 15 to 25 percent slopes, contains so many stones that tilth is generally poor. Surface runoff is medium, and the water-supplying capacity is low. Because they are moderately steep, very erosive, and stony, these soils are suited only to pasture and trees. All of the acreage is wooded. Yields of forest products are low. (Capability unit VIe–1; woodland suitability group 7.)

Clifton-Davidson stony complex, 25 to 60 percent slopes (CLF).—The surface layer of this complex of soils is dark yellowish-brown to dark-red stony loam. It is underlain by brown to strong-brown or dark-red stony clay loam.

These soils are shallow as well as stony. They are difficult to work and respond poorly to management. Surface runoff is medium, and the water-supplying capacity is moderate to low. These soils are too steep and too erosive for cultivation. They are best suited to trees, and all of the acreage is in trees. Yields of forest products are low. (Capability unit VIIe–2; woodland suitability group 12.)

Clifton-Davidson stony complex, 60 to 90 percent slopes (CLG).—The surface layer of this soil complex is dark yellowish-brown to dark reddish-brown stony loam, about 4 inches thick. It is underlain by brown, strong-brown, or dark-red stony clay loam.

In most places these soils are shallow and have a low water-supplying capacity. Runoff is rapid. Because they are very steep and stony, they are suited only to trees. (Capability unit VIIe–2; woodland suitability group 15.)

Colfax Series

The Colfax series consists of gently sloping to sloping, somewhat poorly drained, strongly acid soils. These soils have formed on low uplands and at the base of slopes in material weathered from light-colored granite and gneiss. The surface layer is grayish-brown sandy loam, about 3 to 5 inches thick, and the subsoil, mottled yellowish-brown sandy clay.

These soils occur with the Appling and Cecil soils. They are more poorly drained and more intensely mottled than those soils and have a much redder subsoil than the Cecil soils.

In this county the Colfax soils are in small areas in the southern part. The native vegetation was hardwoods, mainly oak, hickory, poplar, gum, and maple, but some areas have been cleared and cultivated. These soils, however, are not productive, and many areas have been abandoned and have reverted to alder, gum, oak, and hickory.

Most of the acreage of these soils is in hardwood trees, but a small part is in pasture. Pasture is suited to areas that are artificially drained but produces only low to moderate yields.

Colfax sandy loam, 2 to 6 percent slopes (CiB).—This soil is somewhat poorly drained and strongly acid. It is on low uplands and at the base of slopes. The major horizons in the profile are—

0 to 5 inches, grayish-brown, very friable sandy loam.
5 to 24 inches, yellowish-brown, mottled, firm sandy clay; moderate, subangular blocky structure.
24 to 62 inches, brownish-yellow sandy clay.

Some areas are covered by a thin overburden of transported material. This soil is generally in poor tilth, but it responds fairly well to good management. At times the water table rises and thins the root zone. Water runs off this soil slowly, and that entering the soil passes through the subsoil slowly. A moderate amount of water is held available for plants. Impeded drainage narrows the range of suitable crops.

This soil is best suited to hay and pasture, and most of the acreage is in pasture. Row crops are not well suited and produce low yields. (Capability unit IIIw–3; woodland suitability group 4B.)

Colfax sandy loam, 6 to 10 percent slopes, eroded (CiC2).—This soil has a thinner surface layer and a greater erosion hazard than does Colfax sandy loam, 2 to 6 percent slopes. The surface soil is rapidly permeable, grayish-brown sandy loam, about 3 inches thick. It is underlain by slowly permeable, firm, yellowish-brown sandy clay. A few shallow gullies have formed in places.

This soil is generally in poor tilth. The water-supplying capacity is low, and surface runoff is medium. These limitations and impeded drainage narrow the range of suitable plants.

This soil is suited to only a few of the crops commonly grown in the county. Yields are low. Most of the acreage is in pasture and scrubby hardwoods. (Capability unit VIe–2; woodland suitability group 4B.)

Congaree Series

The Congaree series consists of well-drained, strongly acid soils. These soils have formed in general alluvium recently deposited on flood plains or in local alluvium recently deposited around the head of draws. In most places the surface layer is dark-brown silt loam, about 30 inches thick. It is underlain by dark-brown material that is sandier than the surface layer. Slopes range from 0 to 6 percent but are generally about 2 percent.

These soils occur with the Buncombe, Chewacla, and Wehadkee soils in small areas along permanent streams. They are not nearly so sandy as the Buncombe soils. The Congaree soils are better drained than the mottled, somewhat poorly drained to poorly drained Chewacla and Wehadkee soils.

The native vegetation was water-tolerant hardwoods, mainly oak, hickory, poplar, gum, and maple. Most areas, however, have been cleared and cultivated. Some of these have been abandoned and are reverting to alder and poplar.

Most of the acreage is cropland, but a large part is pasture. Corn, small grain, pasture, and hay are well suited and are commonly grown. Yields are generally moderate to high.

Congaree silt loam (0 to 2 percent slopes) (Con).—This is a well-drained, medium-textured, dark-brown soil on flood plains. The major horizons in the profile are—

0 to 30 inches, dark-brown, very friable silt loam.
30 to 40 inches, dark-brown, very friable fine sandy loam.

In this county Congaree silt loam is not so smooth as it is elsewhere. Included with this soil in the northeastern part of the county are many small areas that have a fine sandy loam surface layer.

This soil is one of the most productive in the county. Good tilth is easy to maintain, and the root zone is thick. Surface runoff is slow, and the water-supplying capacity is moderate to high. The soil is eroded in only a few places, but it is likely to be scoured and overwashed by floods. A few small spots need drainage.

This soil is suited to a wide range of plants, including most of the crops grown locally. It responds well to good managemant and can be used for row crops every year. Most of the soil is cultivated. (Capability unit IIw–2; woodland suitability group 1.)

Congaree soils, local alluvium (2 to 6 percent slopes) (Cng).—These are well-drained, medium-textured, dark-brown soils that have developed in local alluvium around the head of draws. In most places they are not so likely to be flooded as is Congaree silt loam. In a profile that has a fine sandy loam surface layer, the major horizons are—

0 to 15 inches, dark-brown and very friable fine sandy loam.
15 to 20 inches, dark-brown, very friable loam.
20 to 36 inches +, yellowish-brown, friable sandy clay loam.

The surface soil ranges from silt loam to sandy loam. The alluvial material is 12 inches to several feet thick over residual material.

Congaree soils, local alluvium, are scattered in small areas in the central and southern parts of the county. Tilth is generally good, surface runoff is slow to very slow, and the water-supplying capacity is moderate to high. The profile is strongly acid.

These soils are suited to a wide range of plants and can be planted to all crops grown locally. They respond well to good management. Row crops can be grown annually, and most of the acreage is cultivated. Yields are high (Capability unit I–1; woodland suitability group 1.)

Davidson Series

The Davidson series consists of strongly sloping to very steep, well-drained soils. These soils have formed in material weathered from basic rock, chiefly hornblende and diorite. The surface soil is dark reddish-brown loam and is underlain by dark-red clay. In Habersham County the solum is thinner than is typical of Davidson soils in other parts of the country.

These soils occur with the Musella and Cecil soils. They are deeper to bedrock than the Musella soils. They have a redder surface soil and a darker subsoil than the Cecil soils, which have formed from acid rock.

In this county the Davidson soils are scattered in small areas in the northwestern part. The native vegetation was hardwoods, mainly oak, hickory, chestnut, poplar, maple, and gum. Many areas have been cleared and cultivated, but some have reverted to Virginia pine and shortleaf pine. Most of the acreage is now in trees, but a few areas are cultivated or are in pasture.

Davidson loam, thin solum, 15 to 25 percent slopes (DnE).—This soil is well drained and has developed in material weathered from basic rock. The major horizons in the profile are—

0 to 5 inches, dark reddish-brown, very friable loam.
5 to 38 inches, dark-red, friable clay loam in the upper part; dark-red to reddish-brown, firm clay with moderate, angular blocky structure in the lower part.
38 to 70 inches, yellowish-red sandy clay.

This soil is strongly acid, is generally in fair tilth, and responds fairly well to good management. Surface runoff is medium, and the water-supplying capacity is medium to slow. This soil is too steep for cultivation. It is best suited to legumes, hay, pasture, and trees, but yields are only moderate. Most of the acreage is wooded. (Capability unit VIe–2; woodland suitability group 9.)

Davidson loam, thin solum, 25 to 60 percent slopes (DnF).—The surface layer of this soil is reddish-brown loam, about 4 inches thick. It is underlain by dark-red clay loam or clay, about 20 to 30 inches thick.

Surface runoff is medium to rapid, and the water-supplying capacity is moderate to low. Tilth is generally poor, and productivity is only fair. Because of the severe hazard of erosion, this soil should not be bare at any time. It is suited to only a few uses. It is mostly in trees, which is its best use. (Capability unit VIIe–1; woodland suitability group 12.)

Davidson loam, thin solum, 10 to 15 percent slopes, eroded (DnD2).—The reddish-brown surface layer of this eroded soil is only 2 inches thick. It is 2 to 4 inches thinner than the surface layer in Davidson loam, thin solum, 15 to 25 percent slopes. The subsoil, about 30 inches thick, is red clay or clay loam. A few gullies have formed in places.

This soil is moderately deep and responds fairly well to good management. It is generally in fair tilth and is fairly easy to work. The water-supplying capacity is moderate to low, and surface runoff is medium.

Because of the severe hazard of erosion, this soil should not be cultivated more than once in every 4 to 6 years. It is best suited to legumes, tree fruits, hay, pasture, and forest trees, and it produces moderate yields. Most of the acreage is in pasture and trees. (Capability unit IVe–1; woodland suitability group 9.)

Habersham Series

The Habersham series consists of gently sloping to strongly sloping, well-drained soils that are highly leached and strongly acid. These soils have formed in material weathered from quartzite, quartzitic gneiss, granite, and schist. In uneroded areas the surface layer is yellowish-brown fine sandy loam and is about 10 inches thick. It is underlain by brown to strong-brown fine sandy loam to fine sandy clay loam, about 18 inches thick.

Habersham soils occur with the Cecil and Madison soils but are sandier, paler, and more poorly developed than those soils. They are in large areas near Tallulah Falls in the northeastern part of the county.

The native vegetation was hardwoods, mainly oak, hickory, chestnut, chestnut oak, gum, and maple. Many areas have been cleared and cultivated, but some have been abandoned and have reverted to Virginia pine and shortleaf pine.

These soils are low in fertility and generally produce low to moderate yields. Most of the acreage is in trees, but small areas are in corn, in tree fruits, or in hay and pasture.

Habersham fine sandy loam, 6 to 10 percent slopes (HAC).—This soil is well drained and highly leached. In most places the subsoil is brown to strong-brown fine sandy loam. The major horizons in the profile are—

0 to 10 inches, yellowish-brown, very friable fine sandy loam.
10 to 28 inches, brown to strong-brown, friable fine sandy loam with weak, subangular to angular blocky structure in the upper part; yellowish-red sandy clay loam with moderate, angular blocky structure in the lower part.
28 to 64 inches, yellowish-red, weathered parent material.
64 inches +, pink, yellow, and gray, hard quartzitic rock.

This soil is strongly acid and low in fertility, but it responds fairly well to good management. It is generally in good tilth and has a fairly thick root zone. Surface runoff is slow, but erosion is a moderate hazard in cultivated fields. The water-supplying capacity is moderate to low. This soil is suited to most of the crops commonly grown in the county, but most of the acreage is in trees. (Capability unit IIIe–2; woodland suitability group 4B.)

Habersham fine sandy loam, 2 to 6 percent slopes, eroded (HAB2).—This soil has a surface layer of yellowish-brown fine sandy loam that is about 10 inches thick. The subsoil is fine sandy loam and fine sandy clay loam, about 20 inches thick.

This soil is moderately productive. Tilth is generally very good, and the root zone is moderately thick. The water-supplying capacity is moderate, and surface runoff is slow. Erosion is a slight hazard in cultivated fields.

Though this soil is highly leached and is low in fertility, it responds well to management. It is suited to most of the crops commonly grown in the county. Most of the acreage is cultivated or in pasture. (Capability unit IIe–2; woodland suitability group 4B.)

Habersham fine sandy loam, 6 to 10 percent slopes, eroded (HAC2).—This soil has a surface layer of yellowish-brown fine sandy loam, about 6 inches thick. The subsoil consists of fine sandy clay loam, about 18 inches thick. A few gullies have formed in some places.

This soil has a moderately thick root zone and is generally in very good tilth. The water-supplying capacity is low, and surface runoff is moderate. Erosion is a moderate hazard.

Most of the soil is in cultivated crops. It responds fairly well to good management and is suited to most of the common crops grown locally. Yields are moderate to low. (Capability unit IIIe–2; woodland suitability group 4B.)

Habersham fine sandy loam, 10 to 15 percent slopes, eroded (HAD2).—The surface layer of this soil is yellowish-brown fine sandy loam and is about 6 inches thick. It is underlain by a fine sandy clay loam subsoil, about 16 inches thick. A few gullies have formed in places.

This soil is generally in good tilth, but its root zone ranges from thick to thin. The water-supplying capacity is low, and surface runoff is slow to medium. Leaching is intense, fertility is low, and the slopes are too strong for regular cultivation. The response to management, however, is fairly good.

Erosion is a severe hazard in cultivated fields, but under very careful management, the less sloping parts can be used for row crops once in 5 or 6 years. The best suited crops are legumes, tree fruits, hay, pasture, and trees. Yields are moderate. Most of this soil is in pasture or trees. (Capability unit IVe–1; woodland suitability group 4B.)

Halewood Series

The Halewood series consists of gently sloping to steep, well-drained, strongly acid soils. These soils have formed on uplands in material weathered from mica schist and quartz mica schist. In uneroded areas the surface layer is yellowish-brown fine sandy loam, about 7 inches thick. The subsoil is strong-brown to yellowish-red clay loam.

Halewood soils occur with the Cecil soils but are less red. The Halewood soils are scattered in small areas in the southern part of the county and are in more extensive areas in the northern part.

The native vegetation was hardwoods, mainly oak, hickory, chestnut, poplar, gum, and maple. Many areas have been cleared and cultivated, but some fields have been abandoned and have reverted to Virginia pine and shortleaf pine. Most of the acreage is in trees, though small areas are in cultivated crops or pasture.

Halewood fine sandy loam, 6 to 10 percent slopes (HEC).—This is a well-drained, strongly acid soil that has formed in material weathered from mica schist and quartz mica schist. The major horizons in the profile are—

0 to 7 inches, yellowish-brown, very friable fine sandy loam.
7 to 40 inches, strong-brown to yellowish-red, friable fine sandy clay loam to clay loam; weak, angular blocky structure; may be mottled in the lower part.
40 to 63 inches +, yellowish-red, soft, gneissic material.

Included with this soil in the northeastern part of the county are small areas of loam. In most places the subsoil is moderately permeable, yellowish-red clay loam.

This soil is generally in good tilth and has a thick root zone. The water-supplying capacity is moderate, and surface runoff is slow.

Erosion is a moderate hazard in cultivated fields. This soil is suited to most plants commonly grown in the county and produces high yields. Corn, legumes, tree fruits, hay, pasture, and trees are well suited to this soil, but most of

the acreage is in pasture. (Capability unit IIIe–2; woodland suitability group 4B.)

Halewood fine sandy loam, 2 to 6 percent slopes, eroded (HEB2).—This soil has a yellowish-brown fine sandy loam surface layer, about 4 inches thick. The subsoil is strong-brown to yellowish-red fine sandy clay loam and is mottled in the lower part. It is about 33 inches thick. A few gullies have formed in places.

The tilth of this soil is generally good, and the root zone is moderately thick to thick. The water-supplying capacity is low, and surface runoff is moderate. Erosion is a slight to moderate hazard.

This soil responds well to good management and is suited to most of the crops commonly grown in the county. Yields are moderate. Most of the acreage is in pasture. (Capability unit IIe–2; woodland suitability group 4B.)

Halewood fine sandy loam, 6 to 10 percent slopes, eroded (HEC2).—This soil has a yellowish-brown fine sandy loam surface layer, about 6 inches thick. The subsoil, about 33 inches thick, is strong-brown to yellowish-red sandy clay loam. A few gullies have formed in places.

The tilth of this soil is generally good, and the root zone is moderately thick to thick. The water-supplying capacity is low, and surface runoff is medium. Erosion is a moderate hazard.

This soil responds fairly well to management. It is suited to most of the crops commonly grown in the county and produces moderate yields. Crops well suited are corn, legumes, tree fruits, hay, pasture, and trees. Most of the acreage is in pasture. (Capability unit IIIe–2; woodland suitability group 4B.)

Halewood fine sandy loam, 10 to 15 percent slopes (HED).—The surface layer of this soil is yellowish-brown fine sandy loam, about 6 inches thick. The subsoil is strong-brown to yellowish-red heavy fine sandy loam to clay loam and is about 30 inches thick.

Tilth is fair, and the root zone is thick. The water-supplying capacity is moderate, and surface runoff is medium.

This soil responds fairly well to good management. The slopes are too strong for frequent cultivation, but under very careful management, row crops can be planted once every 5 or 6 years. Legume-grass pasture, tree fruits, hay, and trees are best suited, but most of the acreage is in trees. Yields are moderate. (Capability unit IVe–1; woodland suitability group 4B.)

Halewood fine sandy loam, 15 to 25 percent slopes (HEE).—This soil has a yellowish-brown fine sandy loam surface layer, about 5 inches thick. The subsoil, about 28 inches thick, is strong-brown to yellowsh-red heavy fine sandy loam to clay loam.

Tilth is generally fair in this soil, and the root zone is thick. The water-supplying capacity is moderate, and surface runoff is medium.

Because this soil is steep and is susceptible to severe erosion, cultivation is not practical. The best uses are legume-grass pasture, hay, and trees. Yields are moderate. Most of the acreage is in trees. (Capability unit VIe–2; woodland suitability group 5.)

Halewood fine sandy loam, 25 to 60 percent slopes (HEF).—This soil has a yellowish-brown fine sandy loam surface layer, about 5 inches thick. The subsoil is strong-brown to yellowish-red heavy fine sandy loam to clay loam and is about 22 inches thick.

The tilth of this soil is generally poor, and the root zone ranges from thin to moderately thick. Surface runoff and the water-supplying capacity are moderate.

This steep soil is not suited to cultivated crops. It is very susceptible to erosion and should not be left bare at any time. All of this soil is wooded and should remain in trees. It responds fairly well to good management and produces fair yields. (Capability unit VIIe–1; woodland suitability group 12.)

Hiwassee Series

The Hiwassee series consists of gently sloping to strongly sloping, well-drained, strongly acid soils. These soils have formed on high stream terraces in old alluvium. Their surface soil is dark reddish-brown loam and is about 4 inches thick. It is underlain by thick, dark-red clay.

These soils occur with the Altavista, Augusta, Masada, and Wickham soils. The Hiwassee soils are steeper and occur on higher terraces than the Altavista and Wickham soils and have a darker red subsoil. The subsoil is yellowish red in the Wickham soils and is light red, yellow, or brown and is mottled in the Altavista and Masada soils. The Hiwassee soils are much better drained than the Augusta soils.

In this county the Hiwassee soils are scattered in areas near large streams. Their native vegetation was hardwoods, mainly oak, hickory, chestnut, poplar, gum, and maple. Though many areas have been cleared and are cultivated, some fields have been abandoned and have reverted to Virginia pine and shortleaf pine. Most of the acreage of these soils is wooded, but a few areas are in cultivated crops or in pasture.

Hiwassee fine sandy loam, 2 to 6 percent slopes, eroded (HQB2).—This is a well-drained soil on high stream terraces. It has formed in old general alluvium (fig. 2). The major horizons in the soil profile are—

0 to 4 inches, dark reddish-brown, friable fine sandy loam.
4 to 42 inches, dark-red, firm clay; strong, angular blocky structure.
42 to 59 inches +, dark-red clay loam.

Figure 2.—**Road cut in Hiwassee fine sandy loam, 2 to 6 percent slopes, eroded. Note the sharp, smooth boundary between old general alluvium and underlying residuum from mica schist.**

This soil has lost about half of the original surface layer through erosion; the present surface soil averages about 4 inches in thickness. A few shallow gullies have formed in places. In most places the subsoil is moderately slow in permeability. Included with this soil are small areas of red to dark-red loam and clay loam. In these areas the soil material has washed from higher areas of Davidson, Musella, and other soils.

This soil is generally in fair tilth, is deep, and responds well to good management. The water-supplying capacity is moderate, and surface runoff is slow.

Most of the crops commonly grown in the country are suited to this soil, but most of the acreage is in pasture. Yields are high. Good management is needed for cultivated crops because this soil is slightly to moderately susceptible to erosion. (Capability unit IIe–1; woodland suitability group 4A.)

Hiwassee fine sandy loam, 6 to 10 percent slopes, eroded (HQC2).—This soil has a dark reddish-brown fine sandy loam surface layer, about 4 inches thick. The subsoil, about 38 inches thick, is dark-red clay. A few gullies have formed in places.

Tilth is generally fair, and the root zone is thick. The water-supplying capacity is moderate, and surface runoff is medium.

Though erosion is a serious hazard in cultivated fields, this soil responds well to management and is suited to a wide range of plants. Suitable crops are corn, pimento pepper, small grain, winter legumes, tree fruits, hay, pasture, and trees. Yields are moderate. (Capability unit IIIe–1; woodland suitability group 4A.)

Hiwassee fine sandy loam, 10 to 15 percent slopes, eroded (HQD2).—This soil has a surface layer of dark reddish-brown fine sandy loam, about 3 inches thick. The subsoil, about 36 inches thick, is dark-red clay. There are a few gullies in some places.

Tilth is generally fair, and the root zone is thick. The water-supplying capacity is moderate, and surface runoff is medium.

This soil responds fairly well to good management, but it is not suited to frequent cultivation. The strong slopes and the erosion hazard limit the range of suitable crops. The best uses are legume-grass pasture, small grains, tree fruits, hay, and trees. Yields are moderate. If it is managed carefully, this soil can be planted to cultivated crops once every 5 or 6 years. Most of the acreage is wooded. (Capability unit IVe–1; woodland suitability group 4A.)

Hiwassee fine sandy clay loam, 6 to 10 percent slopes, severely eroded (HRC3).—This soil has lost most, or all, of the original surface soil and part of the subsoil through erosion. The present surface layer of dark-red fine sandy clay loam consists mainly of subsoil material. Many small gullies have formed; some of these are too deep to be crossed by farm machinery, and many are getting larger.

In the northwestern part of the county on the Sautee Creek watershed, there is about 70 acres of soil that is similar to this soil but that formed in residual material instead of in old alluvium.

This soil is generally in poor tilth. The water-supplying capacity is low, and surface runoff is rapid.

This soil responds fairly well to good management. Because erosion is a severe hazard, however, frequent cultivation is not feasible. Row crops should not be grown more than once in 5 or 6 years. Most of the acreage is in trees. Yields are moderate to low. (Capability unit IVe–2; woodland suitability group 3.)

Hiwassee fine sandy clay loam, 10 to 15 percent slopes, severely eroded (HRD3).—This soil has lost most, or all, of its original surface soil and part of the subsoil. The present surface layer consists chiefly of subsoil material and is dark-red fine sandy clay loam. Many small gullies have formed; some are too deep to be crossed by farm machinery, and many are getting larger.

About 53 acres of soil that formed in residual material instead of in old alluvium are included with this soil. This included soil is similar to Hiwassee fine sandy clay loam, 10 to 15 percent slopes, severely eroded. It occurs in the Sautee Creek watershed in the northwestern part of the county. About 20 acres is so severely eroded that it is almost useless for agriculture.

The tilth of this soil is generally poor. The water-supplying capacity is low, and surface runoff is rapid. Further erosion is a serious hazard.

This soil responds fairly well to good management but is not suited to frequent cultivation. It is best suited to pasture consisting of legumes and grasses and to tree fruits, hay, and trees. Yields are low. Most of the acreage is in trees. (Capability unit IVe–2; woodland suitability group 3.)

Lloyd Series

The Lloyd series consists of gently sloping to strongly sloping, well-drained, acid soils. These soils have formed on uplands in material weathered from mixed acid and basic rock. In uneroded areas the surface layer is reddish-brown to dark reddish-brown loam and is about 8 inches thick. It is underlain by a dark-red to red clayey subsoil, about 28 inches thick.

These soils occur with the Cecil and the Madison soils but have a darker red subsoil than those soils. The Lloyd soils are generally less micaceous and deeper than the Madison soils.

In this county the Lloyd soils are scattered in the southern part. Oak and hickory made up most of the native vegetation, but there was some chestnut, poplar, gum, and maple. Many areas have been cleared and cultivated, but most of these have been abandoned and have reverted to Virginia pine and shortleaf pine. Though much of the acreage is in trees, some areas are cultivated or in pasture.

Lloyd loam, 6 to 10 percent slopes (LfC).—This is a well-drained, strongly acid soil on uplands. The major horizons in the soil profile are—

0 to 8 inches, dark reddish-brown, friable loam.
8 to 36 inches, dark-red sandy clay loam in the upper part; red to dark-red, firm clay in the lower part; moderate, angular blocky structure.
36 to 60 inches +, red, weathered material consisting of schist and gneiss.

The surface soil ranges from reddish brown to dark reddish brown. The clayey subsoil ranges from red to dark red and is moderately slow in permeability. Included with this soil are small areas of deep or very deep, dark-red soil that has developed in material weathered from basic rock.

Lloyd loam, 6 to 10 percent slopes, is generally in fair tilth. It has a thick root zone. The water-supplying

capacity is moderate, and surface runoff is slow to medium. In cultivated fields erosion is a moderate hazard.

This soil responds well to good management and is suited to a wide range of crops, but most of the acreage is in trees. Well-suited crops are corn, pimento pepper, alfalfa, winter legumes, tree fruits, hay, pasture, and trees. Yields are moderate to high. (Capability unit IIIe–1; woodland suitability group 9.)

Lloyd loam, 2 to 6 percent slopes, eroded (LfB2).—The surface layer of this eroded soil is only about 4 inches thick. It is dark reddish-brown loam and is underlain by a red to dark-red, clayey subsoil, about 30 inches thick. A few gullies have formed in some places.

The tilth of this soil is generally fair, and the root zone is thick. The water-supplying capacity is moderate, and surface runoff is slow. Erosion is a slight to moderate hazard.

This soil responds well to good management and is suited to almost all of the crops grown locally, but most of the acreage is in pasture. Suitable crops are corn, pimento pepper, alfalfa, winter legumes, tree fruits, hay, pasture, and trees. Yields are moderate to high. (Capability unit IIe–1; woodland suitability group 9.)

Lloyd loam, 6 to 10 percent slopes, eroded (LfC2).—The surface layer of this soil is dark reddish-brown loam, about 4 inches thick. It is underlain by a red to dark-red, clayey subsoil that is about 28 inches thick. A few gullies have formed in some places.

Tilth is generally fair in this soil, and the root zone is thick. The water-supplying capacity is moderate, and surface runoff is slow to medium. The erosion hazard is moderate.

This soil responds well to good management and produces moderate yields. It is suited to almost all plants grown in the county, but most of the acreage is in pasture. Well-suited crops are corn, pimento pepper, alfalfa, winter legumes, tree fruits, hay, pasture, and trees. Because it is moderately susceptible to erosion, this soil should be kept in close-growing crops at least 2 years in 3. Row crops should not be grown more than 2 years in succession. (Capability unit IIIe–1; woodland suitability group 9.)

Lloyd loam, 10 to 15 percent slopes, eroded (LfD2).—This soil has a surface layer of dark reddish-brown loam, about 4 inches thick. Beneath this layer is a subsoil of red to dark-red clay loam, about 26 inches thick. A few gullies have formed in some place. Included with this soil are small, scattered, less eroded areas that have a surface layer 6 inches thick.

The tilth of this soil is generally fair, and the root zone is thick. The water-supplying capacity is moderate, and surface runoff is medium. Erosion is a severe hazard.

This soil responds fairly well to good management, but the slopes are too strong and erosive to be cultivated frequently. Under very careful management, however, this soil can be used for row crops 1 year in 5 or 6. The soil is mostly in pasture. Alfalfa, legumes, hay, pasture, and trees are best suited. Yields are moderate. (Capability unit IVe–1; woodland suitability group 9.)

Lloyd clay loam, 6 to 10 percent slopes, severely eroded (LeC3).—The original surface layer of this soil has been lost through erosion. The present surface layer consists mainly of red heavy clay loam that was brought up from the subsoil. It is 4 to 6 inches thick. A layer of dark-red clay loam, about 18 to 24 inches thick, underlies the surface layer. Many small gullies have formed. Some of these are too deep to be crossed by tillage implements, and many are getting larger.

Small areas of similar soil on slopes of 2 to 6 percent are included with this soil. These areas total about 70 acres. Also included are small, scattered, very severely eroded areas that total about 30 acres.

The root zone of Lloyd clay loam, 6 to 10 percent slopes, severely eroded, is thick, but tilth is generally poor. The water-supplying capacity is moderate to low, and surface runoff is rapid to medium. Erosion is a moderate hazard.

This soil responds fairly well to good management. Because the erosion hazard is severe, however, this soil should be kept in close-growing crops at least 1 year in 4. Among the crops best suited are corn, pimento pepper, alfalfa, legumes, tree fruits, hay, pasture, and trees. Yields are moderate. Most of the acreage is in pasture, but small areas are cultivated. (Capability unit IVe–2; woodland suitability group 8.)

Lloyd clay loam, 10 to 15 percent slopes, severely eroded (LeD3).—This soil has lost through erosion most, or all, of the original surface layer and some of the subsoil. The present surface layer, about 4 to 6 inches thick, consists mainly of heavy clay loam subsoil material. It is underlain by red to dark-red clay that is 16 to 22 inches thick. Many gullies have formed, and some are getting larger. A number of gullies are too deep to be crossed by farm machinery.

Included with this soil are small, scattered areas of similar soil that is very severely eroded. These areas total about 35 acres.

The tilth of this Lloyd clay loam is generally poor, and the root zone is thick. The water-holding capacity is moderate to low, and surface runoff is rapid.

This soil responds fairly well to management, but it cannot be cultivated frequently because its slopes are strong and erosive. The best uses are for legume-grass pasture, tree fruits, hay, and trees. Yields are moderate. Most of the acreage is in pasture. (Capability unit IVe–2; woodland suitability group 8.)

Louisa Series

The Louisa series consists of moderately steep to very steep, somewhat excessively drained soils that are micaceous and strongly acid to very strongly acid. These soils have formed in material weathered from mica schist, talcose schist, and gneiss of high mica content. The surface layer is thin in most places. It is dark-gray to dark yellowish-brown fine sandy loam and is underlain by yellowish-brown heavy sandy loam that contains pockets of yellowish-red clay loam. These soils occur with the Madison soils but are less well developed and less red than those soils.

In this county the Louisa soils are most extensive in the belt of Brevard schist in the eastern part. They are also in scattered areas in the northern part. The native vegetation consisted of hardwoods, mainly oak, hickory, chestnut, and poplar and some gum and maple. Many areas have been cleared and cultivated, but some of these have been abandoned and have reverted to Virginia pine and shortleaf pine. Most of the acreage is in trees, but a few areas are cultivated or in pasture. Row crops are not well

suited. Corn and small grains are grown in some places, but yields are generally low.

Louisa fine sandy loam, 15 to 25 percent slopes (LjE).—This soil is somewhat excessively drained, strongly acid to very strongly acid, and micaceous. The major horizons in the profile are—

0 to 10 inches, dark-gray to dark yellowish-brown, very friable fine sandy loam.
10 to 18 inches, yellowish-brown, friable heavy sandy loam with pockets of yellowish-red clay loam; structureless.
18 to 36 inches, partly weathered mica schist.

The surface soil is yellowish red in places where this soil has formed in material weathered from basic schist. The subsoil is thin and discontinuous. The depth to bedrock ranges from 12 to more than 18 inches and varies within short distances in some places. Included with this soil are a few small areas of the Madison and the Tusquitee soils.

The tilth of this soil is generally poor, and the root zone is thin. The water-supplying capacity is low, and surface runoff is medium. Erosion is a severe hazard.

Most of this soil is in trees, but several small areas are in hay and pasture. The best use is trees. This soil is moderate to low in productivity. (Capability unit VIIe–2; woodland suitability group 5.)

Louisa fine sandy loam, 25 to 60 percent slopes (LjF).—This soil has a surface layer of dark yellowish-brown fine sandy loam, about 10 inches thick. The subsoil is yellowish brown and very micaceous. Surface runoff is medium, the water-supplying capacity is low, and the root zone is thin.

This soil is best suited to trees and is mostly wooded. It is too steep and shallow for cultivation and should not be left unprotected. (Capability unit VIIe–2; woodland suitability group 12.)

Louisa fine sandy loam, 60 to 90 percent slopes (LjG).—The surface layer of this soil is dark yellowish-brown fine sandy loam, about 10 inches thick. It is underlain by yellowish-brown, very micaceous material. Surface runoff is moderate to rapid, and the water-supplying capacity is low.

Because it is shallow and very steep, this soil is suited only to trees. Most of the acreage is wooded. (Capability unit VIIe–2; woodland suitability group 15.)

Louisa fine sandy clay loam, 15 to 25 percent slopes, severely eroded (LkE3).—All of the original surface layer of this soil has been lost through erosion. The present surface layer consists of the parent material—yellowish-brown, weathered mica schist. Small gullies have formed in many places, and many are getting larger. Some are too deep to be crossed by tillage implements.

Tilth is generally poor, and the root zone is very thin. The water-supplying capacity is very low, and surface runoff is very rapid. Erosion is a severe hazard. Productivity is very low. Most of this soil is in trees because of the erosion hazard and needs to be mainly restricted to that use. (Capability unit VIIe–2; woodland suitability group 13.)

Louisburg Series

The Louisburg series consists of strongly sloping to steep, shallow soils that are somewhat excessively drained and strongly acid. These soils have formed in material weathered from light-colored granite, gneiss, and quartzitic material. In most places they have a dark grayish-brown sandy loam surface soil and a yellowish-brown to light yellowish-brown subsoil.

The Louisburg soils are associated with the Cecil, Louisa, and Appling soils. They have developed from parent material similar to that of the Cecil and Appling soils. Louisburg soils, however, are shallow and have a weak, thin, discontinuous B horizon, whereas the Cecil and Appling soils are deep and generally have a thick, well-developed B horizon. Louisburg soils do not have a highly micaceous substratum like the one that underlies the Louisa soils.

In this county the largest area of the Louisburg soils is near the Habersham mill, but small areas are scattered throughout the county. The native vegetation consisted of hardwoods, mainly oak, hickory, and poplar and some gum and maple. Many areas have been cleared and cultivated, but some of these have reverted to Virginia pine and shortleaf pine.

Most of the acreage of these soils is in trees, and some is in corn and in pasture. Yields are generally moderate to low. Louisburg soils are best suited to trees.

Louisburg sandy loam, 15 to 25 percent slopes (LnE).—This soil is somewhat excessively drained and strongly acid. The major horizons in the profile are—

0 to 14 inches, dark grayish-brown to yellowish-brown, very friable sandy loam.
14 to 32 inches, light yellowish-brown sandy loam mixed with gravel and small rocks.
32 to 40 inches, hard quartzitic gneiss an gneiss.

The surface layer is dark grayish brown, in most places, but it ranges from yellowish red to yellowish brown. The depth to bedrock varies, and in some places hard or soft rock crops out.

This soil has medium surface runoff, low water-supplying capacity, and a severe erosion hazard. It responds fairly well to good management but is too steep and shallow for cultivated crops. It can produce limited quantities of legumes, hay, pasture, and trees, but most of the acreage is wooded. Productivity is moderate to low. (Capability unit VIIe–2; woodland suitability group 5.)

Louisburg sandy loam, 10 to 15 percent slopes, eroded (LnD2).—The surface layer of this soil is dark grayish-brown to yellowish-brown sandy loam and is about 9 inches thick. It is underlain by weathered gneissic material. A few gullies have formed in places.

Included with this soil in the northern part of the county are small areas of similar soil on slopes of 6 to 10 percent. These areas total about 30 acres.

The tilth of this Louisburg sandy loam is generally fair, and the root zone is thin. The water-supplying capacity is low, and surface runoff is medium to rapid.

This soil responds fairly well to good management but is not suited to cultivation. It is best suited to legume-grass pasture and to hay and trees. Yields are low. Most of the acreage is wooded. (Capability unit VIe–3; woodland suitability group 4B.)

Louisburg-Habersham stony fine sandy loams, 25 to 60 percent slopes (LHF).—These two soils are so intermingled that it was not practical to map them separately. They were, therefore, mapped together as one unit.

The Louisburg soils are somewhat excessively drained and occur near slope breaks and on rough, steep slopes.

They make up about 60 percent of the mapping unit. The Habersham soils are well drained and generally occur on smoother slopes and near the head of draws. In most places the Habersham part of this complex is more uniform and deeper than the Louisburg part and has a thicker and more distinct B horizon. The major horizons in the profile of the Louisburg soils are—

0 to 12 inches, dark-brown to dark yellowish-brown stony fine sandy loam.
12 to 30 inches, light yellowish-brown, friable sandy loam mixed with small rocks and angular gravel.
30 to 40 inches +, hard rock.

The major horizons in the Habersham soils are—

0 to 9 inches, yellowish-brown stony fine sandy loam.
9 to 22 inches, brown to strong-brown, friable fine sandy loam; fine, subangular blocky structure.
22 to 40 inches, yellowish-red, weathered parent material.
40 to 60 inches +, very hard rock.

Louisburg-Habersham stony fine sandy loams, 25 to 60 percent slopes, varies in depth to bedrock. In some places the bedrock is at a depth of more than 30 inches; in other places it crops out at the surface. The root zone is generally thin in these soils. Surface runoff is slow to medium, and the water-supplying capacity is moderate to low. Erosion is a severe hazard.

These soils are too steep and shallow for cultivation. They are best suited to trees, and most of their acreage is wooded. Yields are low. (Capability unit VIIs–1; woodland suitability group 12.)

Louisburg-Habersham stony fine sandy loams, 10 to 15 percent slopes (LHD).—These soils have a yellowish-brown surface layer of fine sandy loam, about 14 inches thick. Stones make up about 20 percent of the layer, and rock crops out in a few places. The subsoil is stony. The Louisburg soils make up about 60 percent of the mapping unit and generally occupy steeper and rougher parts of the slopes than the Habersham soils.

These soils are moderate to low in productivity. Their water-supplying capacity is moderate, and surface runoff is slow. The soils are too shallow, stony, and strongly sloping for cultivation. They are best suited to trees, and most of the acreage is wooded. (Capability unit VIIs–1; woodland suitability group 6.)

Louisburg-Habersham stony fine sandy loams, 15 to 25 percent slopes (LHE).—The surface layer of these soils is yellowish-brown stony fine sandy loam, about 12 inches thick. It is about 20 percent stone and is underlain by stony material. Rock crops out in a few places. The Louisburg soils make up about 60 percent of the mapping unit. They occupy steeper and rougher parts of the slopes than the Habersham soils.

The water-supplying capacity in these soils is moderate to low, and surface runoff is medium. The soils are too steep, shallow, and stony for cultivation. They are best suited to trees, and most of their acreage is wooded. Yields are moderate to low. (Capability unit VIIs–1; woodland suitability group 7.)

Louisburg-Habersham stony fine sandy loams, 10 to 15 percent slopes, severely eroded (LHD3).—Through erosion these soils have lost most, or all, of the original surface soil and part of the subsoil. The present surface layer is yellowish-brown stony fine sandy loam; it is less than 3 inches thick and is underlain by stony material. Small gullies have formed in many places, and many are becoming larger. Some of them are too deep to be crossed by tillage implements. The Louisburg soils make up about 60 percent of the mapping unit and generally occupy stronger and rougher parts of the slopes than the Habersham soils.

These soils are very shallow and are generally in poor tilth. The water-supplying capacity is low, and surface runoff is medium to rapid. Erosion is a very severe hazard.

The soils respond poorly to good managment. They are suited only to trees, and most of the acreage is wooded. Yields are low. (Capability unit VIIs–1; woodland suitability group 6.)

Madison Series

The Madison series consists of gently sloping to steep, well-drained soils that are strongly acid and micaceous. These soils have developed on uplands, chiefly in material weathered from quartz mica schist and mica schist. In most places these soils have a reddish-brown fine sandy loam surface soil and a red clay loam subsoil.

The Madison soils are associated with the Cecil, Appling, Lloyd, and Halewood soils. They contain more mica throughout the profile than do the Cecil and Appling soils and lack the dark-red subsoil of the Lloyd soils. Their subsoil is redder than that in the Appling and Halewood soils.

The Madison soils occur in large areas in this county and make up more than one-fourth of the total acreage. The native vegetation consisted of hardwoods, mainly oak, hickory, chestnut, and poplar and some gum and maple. Many areas have been cleared and cultivated, but some of these have been abandoned and have reverted to Virginia pine and shortleaf pine. Most of the acreage of these soils is in trees, but many areas are cultivated or in pasture.

Madison fine sandy loam, 6 to 10 percent slopes (MjC).—This soil is on uplands and is well drained and strongly acid. The major horizons in the profile are—

0 to 4 inches, reddish-brown, very friable fine sandy loam.
4 to 31 inches, red, firm clay loam; moderate, angular blocky structure; many small mica flakes.
31 to 67 inches, red, weak-red, and reddish-brown, weathered soft mica schist.

The surface layer ranges from reddish brown to yellowish red in color but does not vary much in thickness. The subsoil is red in most places, but it ranges from yellowish red to dark red and is micaceous.

Included with this soil are areas that have a thinner subsoil than is normal. In these inclusions the surface soil and subsoil combined are about 23 inches thick. The inclusions total about 248 acres and occur mainly in the northern and eastern parts of the county.

The tilth of this Madison fine sandy loam is generally good, and the root zone is moderately thick to thick. The water-supplying capacity is moderate, and surface runoff is moderately slow.

This soil responds well to good management and is suited to almost all crops grown in the county. Well-suited crops are corn, pimento pepper, alfalfa, tree fruits, legumes, hay, pasture, and trees. Yields are high. Because it is strongly sloping and erosive, this soil should be kept in close-growing crops two-thirds of the time.

Row crops should not be grown for more than 2 years in succession. Most of the acreage is in trees. (Capability unit IIIe–1; woodland suitability group 4A.)

Madison fine sandy loam, 10 to 15 percent slopes (MjD).—The surface layer of this soil is reddish-brown to yellowish-red fine sandy loam and is about 5 inches thick. Beneath this is a layer of micaceous, red clay loam that is about 26 inches thick.

Included with this soil are areas that have a thinner subsoil than is normal. In these inclusions the surface soil and subsoil combined are about 22 inches thick. The inclusions cover about 1,868 acres and occur mostly in the northern and eastern parts of the county.

Tilth is generally fair, and the root zone is moderately thick. The water-supplying capacity and surface runoff are moderate.

This soil responds well to good management, but it is too steep and too erosive for intensive cultivation. It is best suited to tree fruits, hay, pasture, and trees. Yields are high. Under careful management cultivated crops can be grown 1 year in 5 or 6. Most of the acreage is wooded. (Capability unit IVe–1; woodland suitability group 4A.)

Madison fine sandy loam, 15 to 25 percent slopes (MjE).—The surface layer of this soil consists of reddish-brown to yellowish-red fine sandy loam and is about 5 inches thick. The micaceous subsoil of red clay loam is about 20 to 24 inches thick. Some areas of this soil in the southern part of the county are thicker or thinner than the soil described.

The tilth of this soil is generally poor, and the root zone is moderately thick. The water-supplying capacity is moderate, and surface runoff is moderate. Erosion is a severe hazard.

This soil responds fairly well to good management, but it is too steep and too erosive for cultivation. Most of the acreage is wooded. The best uses are legumes, tree fruits, hay, pasture, and trees. Yields are high to medium. (Capability unit VIe–2; woodland suitability group 5.)

Madison fine sandy loam, 25 to 60 percent slopes (MjF).—The reddish-brown to yellowish-red fine sandy loam surface layer of this soil is about 4 inches thick. It is underlain by red to dark-red, micaceous material that is about 20 inches thick.

This steep soil is too erosive to be cultivated. Surface runoff is medium to rapid, and the water-supplying capacity is moderate. Most of the acreage is wooded and is best suited to trees. (Capability unit VIIe–1; woodland suitability group 12.)

Madison fine sandy loam, 2 to 6 percent slopes, eroded (MjB2).—This soil has a reddish-brown to yellowish-red surface layer, about 3 inches thick, that is mixed in places with subsoil material. The subsoil is micaceous, red clay loam and is about 29 inches thick. A few gullies have formed in places.

Good tilth is easy to maintain in this soil, and the root zone is moderately thick. The water-holding capacity is moderate, and surface runoff is medium to slow. Erosion is a slight to moderate hazard.

This soil responds well to good management and is suited to almost all of the crops grown in the county. Most of the acreage is cultivated. Well-suited crops are corn, pimento pepper, legumes, alfalfa, tree fruits, hay, pasture, and trees. This soil should be kept in close-growing crops at least half of the time. Row crops should not be grown more than 2 years in succession. (Capability unit IIe–1; woodland suitability group 4A.)

Madison fine sandy loam, 6 to 10 percent slopes, eroded (MjC2).—This soil has a reddish-brown to yellowish-red surface soil, about 3 inches thick, that is mixed in places with subsoil material. The subsoil is micaceous, red clay loam and is about 27 inches thick. A few gullies have formed in places.

In the north-central part of the county are areas where the subsoil is 23 instead of 27 inches thick. These areas total about 1,462 acres.

The tilth of this soil is generally fair, and the root zone is moderately thick. The water-supplying capacity is moderate, and surface runoff is medium to slow. Erosion is a moderate hazard.

This soil responds well to good management and is suited to a wide range of plants. Close-growing crops, however, should be grown 2 years in 3. Most of the acreage is cultivated, but some parts have been taken out of cultivation and have been planted to sod crops for hay and pasture (fig. 3). (Capability unit IIIe–1; woodland suitability group 4A.)

Madison fine sandy loam, 10 to 15 percent slopes, eroded (MjD2).—The reddish-brown to yellowish-red surface layer of this soil is about 3 inches thick and is mixed in places with subsoil material. The subsoil is micaceous, red clay loam and is about 26 inches thick. A few gullies have formed in places.

Areas of shallower soils are included. In the eastern part of the county are about 1,513 acres that have a subsoil 4 inches thinner than is normal for this soil. Other areas, totaling about 47 acres, have soil of about the same color and thickness as the Louisa soils.

The tilth of this Madison fine sandy loam is generally fair, and the root zone is moderately thick. The water-supplying capacity is moderate, and surface runoff is medium to slow.

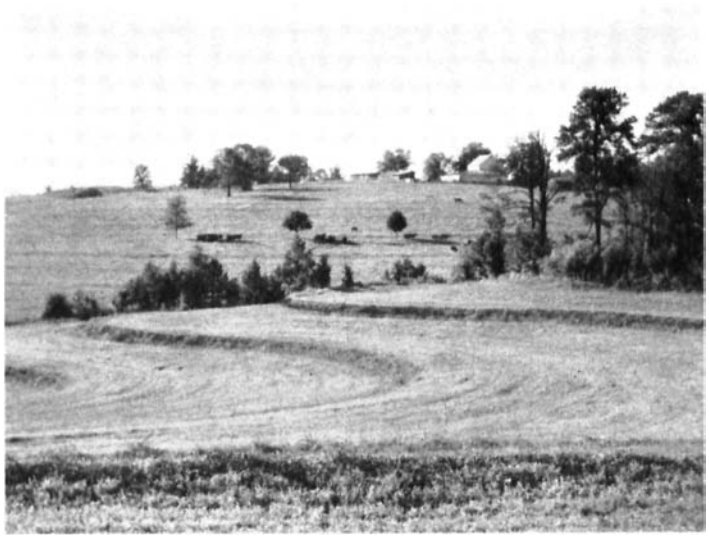

Figure 3.—**In background, hay and pasture on Madison fine sandy loam, 6 to 10 percent slopes, eroded. In foreground, terraced cultivated field.**

This soil responds fairly well to good management. Because it is strongly sloping and erosive, however, it is not suited to frequent cultivation. Under careful management cultivated crops can be grown 1 year in 5 or 6. Suitable crops are legumes, tree fruits, hay, pasture, and trees. Yields are moderate. (Capability unit IVe–1; woodland suitability group 4A.)

Madison fine sandy loam, 15 to 25 percent slopes, eroded (MjE2).—The reddish-brown to yellowish-red surface layer of this soil is about 3 inches thick and is mixed in places with subsoil material. The subsoil is micaceous, red clay loam, about 20 to 24 inches thick. A few gullies have formed in places. Some areas in the northern and eastern parts of the county have a subsoil thinner than 20 inches.

The tilth of this soil is generally fair, and the root zone is moderately thick. The water-supplying capacity is moderate, and surface runoff is medium to rapid.

Most of the acreage of this soil is in pasture or is reverting to trees. Because it is strongly sloping and very erosive, this soil is not suited to cultivation. It is best used for legumes, tree fruits, hay, pasture, and trees. Yields are moderate. (Capability unit VIe–2; woodland suitability group 5.)

Madison fine sandy clay loam, 2 to 6 percent slopes, severely eroded (MkB3).—This soil has lost through erosion most or all of the original surface soil and part of the subsoil. The present surface layer of red fine sandy clay loam is about 4 to 6 inches thick. The subsoil is micaceous, red clay loam and is 18 to 22 inches thick. Many small gullies have formed, and some are getting larger. Some of these gullies are so deep that farm machinery cannot cross them.

The tilth of this soil is generally poor, but the root zone is thick. The water-supplying capacity is low, surface runoff is medium to rapid, and erosion is a severe hazard.

This soil responds fairly well to good management, but it should be kept in sod crops at least two-thirds of the time. Row crops should not be planted more than 2 years in succession. Most of the acreage is in pasture or is cultivated, but some is reverting to trees. Suitable crops are corn, legumes, tree fruits, hay, pasture, and trees. Yields are moderate to low. (Capability unit IIIe–1; woodland suitability group 3.)

Madison fine sandy clay loam, 6 to 10 percent slopes, severely eroded (MkC3).—This soil has lost through erosion most, or all, of the original surface soil and some of the subsoil. The present surface layer of red fine sandy clay loam is 4 to 6 inches thick. The subsoil is 16 to 20 inches thick and is micaceous, red clay loam. Many small gullies have formed, and some are getting larger. A few gullies are so deep that farm machinery cannot cross them.

The tilth of this soil is generally poor, and the root zone is moderately thick. The water-supplying capacity is low, and surface runoff is medium to rapid. Erosion is a severe hazard.

This soil responds fairly well to good management. It is very erosive, however, and should not be cultivated frequently. Most of the acreage is in pasture, but under careful management, the soil can be used for cultivated crops 1 year in 5 or 6. It is best suited to legumes, tree fruits, hay, pasture, and trees. Yields are moderate to low. (Capability unit IVe–2; woodland suitability group 3.)

Madison fine sandy clay loam, 10 to 15 percent slopes, severely eroded (MkD3).—This soil has lost through erosion most, or all, of the original surface soil and some of the subsoil. The present surface layer, about 3 to 5 inches thick, is red fine sandy clay loam. It is underlain by micaceous, red clay loam, 15 to 18 inches thick. Many small gullies have formed. Some of them are too deep to be crossed by farm machinery.

The tilth of this soil is generally poor, and the root zone is moderately thick to thin. The water-supplying capacity is low, and surface runoff is medium to rapid.

Because it is strongly sloping and very erosive, this soil is not suited to cultivation. Its best uses are legumes, hay, pasture, and trees. Yields are moderate to low. Most of the acreage is wooded. (Capability unit VIe–2; woodland suitability group 3.)

Madison fine sandy clay loam, 15 to 25 percent slopes, severely eroded (MkE3).—This moderately steep soil has a surface soil of red fine sandy clay loam, about 3 to 5 inches thick. The subsoil is micaceous clay loam, 15 to 18 inches thick. This soil has lost through erosion most, or all, of the original surface soil and some of the subsoil. In many places small gullies have formed, and many of these are getting larger. Some are so deep that farm machinery cannot cross them.

The tilth of this soil is generally poor, and the root zone is moderately thick to thin. The water-supplying capacity is low, and surface runoff is medium to rapid.

Because it is strongly sloping and erosive, this soil is limited in use mainly to trees. Most of the acreage is wooded, but yields of wood products are low. (Capability unit VIIe–1; woodland suitability group 11.)

Madison fine sandy clay loam, 6 to 10 percent slopes, very severely eroded (MkC4).—This soil has lost through erosion all of the surface soil and part of the subsoil. The present surface layer is about 3 to 5 inches thick and consists mainly of micaceous, red, heavy fine sandy loam from the subsoil. Many gullies have formed, and some of these are getting larger. Some are so deep that farm machinery cannot cross them.

The tilth of this soil is generally poor, and the root zone is thin to moderately thick. The water-supplying capacity is low, and surface runoff is rapid. Erosion is a very severe hazard.

This soil is not suited to cultivation. It is best for legumes, hay, pasture, and trees. Yields are low. Most of the acreage is wooded or is reverting to woods. (Capability unit VIe–2; woodland suitablity group 13.)

Madison fine sandy clay loam, 10 to 15 percent slopes, very severely eroded (MkD4).—This soil has lost through erosion all of the original surface soil and much of the subsoil. The present surface layer consists mainly of subsoil material—micaceous, red, heavy fine sandy clay loam. Many gullies have formed, and some of these are getting larger. Some are too deep to be crossed by farm machinery.

The tilth of this soil is generally poor, and the root zone is thin to moderately thick. The water-supplying capacity is low, and surface runoff is rapid. Erosion is a very severe hazard.

This soil is not suited to cultivation and should be in sod crops or trees. Most of the acreage is wooded or is

reverting to woods. Yields are low. (Capability unit VIIe–1; woodland suitablity group 13.)

Madison fine sandy clay loam, 15 to 25 percent slopes, very severely eroded (MkE4).—All of the original surface layer of this soil and part of the subsoil have been lost through erosion. The present surface layer of micaceous, red, heavy fine sandy clay loam is chiefly subsoil material. Many gullies have formed, and some of these are getting larger. Some are so deep that they cannot be crossed by farm machinery.

The tilth of this soil is generally poor, and the root zone is thin to moderately thick. The water-supplying capacity is low, and surface runoff is rapid. Erosion is a very severe hazard.

This soil is not suited to cultivation. It is best suited to trees and is mostly wooded or is reverting to woods. Yields of wood products are low. (Capability unit VIIe–1; woodland suitability group 13.)

Masada Series

The Masada series consists of gently sloping and sloping, moderately well drained, strongly acid soils on stream terraces. These soils have formed in old general alluvium. The surface layer is grayish-brown to dark grayish-brown fine sandy loam, about 14 inches thick. It is underlain by yellowish-brown to strong-brown sandy clay loam that is about 25 inches thick and is mottled with red in the lower part.

The Masada soils occur with the Hiwassee and the Augusta soils. They are less red than the well-drained Hiwassee soils and are not mottled with gray and olive as are the somewhat poorly drained Augusta soils. The Masada soils generally occur on steeper slopes than Altavista soils and in most places contain much rounded quartzite gravel.

In this county the Masada soils are in small, scattered areas near the large streams. The native vegetation consisted of hardwoods, mainly oak, hickory, chestnut, and poplar and some gum and maple. Many areas have been cleared and cultivated, but some of these areas have been abandoned and have reverted to Virginia pine and shortleaf pine.

Most of the acreage is in trees, but many areas are still cultivated or are in pasture. Corn, pasture, and small grains are well suited to gently sloping fields and generally produce moderate to high yields. Crops that are sensitive to excessive moisture do not thrive on these soils.

Masada fine sandy loam, 2 to 6 percent slopes, eroded (MoB2).—This soil is moderately well drained and strongly acid. It has formed on stream terraces in old general alluvium. The major horizons in the profile are—

0 to 22 inches, grayish-brown to dark grayish-brown, very friable fine sandy loam in the upper part, grading to light olive brown in the lower part.
22 to 36 inches, yellowish-brown to strong-brown, friable to firm sandy loam; moderate, angular blocky structure; lower part mottled in places.
36 to 64 inches, strong-brown to brownish-yellow sandy loam mottled with red.

The surface layer and the subsoil combined range from 30 to as much as 60 inches in thickness. The subsoil is yellowish red to light brown and strong brown.

The tilth of this soil is generally good, and the root zone is thick. The water-supplying capacity is moderate, and surface runoff is slow. Erosion is a slight to moderate hazard.

This soil responds well to good management and is suited to row crops, legumes, orchard crops, hay, and trees. Yields are moderate. Most of the acreage is in pasture. Because of the impeded drainage in the lower part of the subsoil, a few water-sensitive plants do not grow well. (Capability unit IIe–2; woodland suitability group 4A.)

Masada fine sandy loam, 6 to 10 percent slopes, eroded (MoC2).—The fine sandy loam surface layer of this soil is about 22 inches thick. It grades from grayish brown in the upper part to olive brown in the lower part. The subsoil, about 25 inches thick, is yellowish-brown to strong-brown sandy clay loam that is mottled with red in the lower part. Gullies have formed in a few places.

The tilth of this soil is generally good, and the root zone is thick. The water-supplying capacity is moderate, and surface runoff is slow to medium. Erosion is a moderate hazard.

This soil responds well to good management. It is suited to cultivation, but a few water-sensitive crops cannot be grown, because drainage in the lower part of the subsoil is impeded. Suitable for this soil are row crops, legumes, orchard crops, hay, pasture crops, and trees. Yields are moderate. Most of the acreage is in pasture. (Capability unit IIIe–2; woodland suitability group 4A.)

Masada fine sandy loam, 6 to 10 percent slopes, severely eroded (MoC3).—This soil has lost through erosion most, or all, of the original surface soil and some of the subsoil. The present surface layer of light olive-brown to yellowish-brown heavy fine sandy loam is about 5 inches thick. It is underlain by a layer of strong-brown sandy clay loam that is mottled with red in the lower part. This layer is about 20 inches thick. In many places small gullies have formed, and many of these are getting larger. Some are so deep that farm machinery cannot cross them.

Included with this soil are areas of a similar soil that has formed in residual material instead of in alluvium. These areas total about 84 acres. Also included are small, scattered areas of very severely eroded soil on slopes of 10 to 15 percent. These inclusions total about 37 acres.

Good tilth is easy to maintain in this soil. The water-supplying capacity is low, and surface runoff is medium. Erosion is a severe hazard.

This soil responds fairly well to good management. Because it is strongly sloping and very erosive, it is not suited to frequent cultivation. It is best suited to legumes, tree fruits, hay, pasture, and trees. Under careful management, however, it can be planted to cultivated crops 1 year in 5 or 6. Nearly all of the acreage has been cultivated, but much of this is reverting to trees. (Capability unit IVe–1; woodland suitability group 3.)

Musella Series

The Musella series consists of strongly sloping and moderately steep, well-drained soils that are strongly acid. These soils have formed in material weathered from basic rock or from mixed acidic and basic rock. The surface layer is red clay loam, about 6 inches thick. It is underlain by a thin layer of dark-red clay loam that is directly over bedrock.

The Musella soils are associated with the Cecil, Clifton, Davidson, Lloyd, and Madison soils. They have developed from more basic material than have the Cecil and Madison soils. They are shallower than the Cecil and Madison soils and have a thinner and less distinct subsoil. The Musella soils are not so yellow as the Clifton soils and are not so thick or so well developed as the Davidson and Lloyd soils.

The Musella soils in this county are in scattered areas on the strong slopes. Their native vegetation was hardwoods, mainly oak, hickory, chestnut, and poplar and some gum and maple. Some areas have been cleared and cultivated, but some of these have been abandoned and have reverted to Virginia pine and shortleaf pine. Most of the acreage of these soils is now in trees; few areas are in cultivated crops or in pasture.

Musella stony clay loam, 15 to 25 percent slopes, eroded (MwE2).—This soil is well drained, strongly acid, and shallow to bedrock. The major horizons in the profile are—

0 to 6 inches, red stony clay loam.
6 to 17 inches, dark-red, friable to firm stony clay loam; moderate, subangular blocky structure.
17 to 21 inches, mottled red and yellowish-red stony clay loam.
21 inches +, black and dark-red, mottled bedrock.

The surface soil and subsoil combined range from 4 to 17 inches in thickness but are about 10 inches thick in most places. In the northwestern part of the county are about 30 acres of similar soil that is only slightly eroded, and about 33 acres of deeper, very severely eroded soil.

This soil has a thin root zone, and is generally poor in tilth. The water-supplying capacity is moderate to low, and surface runoff is moderate to rapid. Erosion is a severe hazard.

This soil is too steep, too stony, and too eroded for cultivation. Most of the acreage is wooded and is best suited to woods, but some areas can be seeded to sod crops. (Capability unit VIe–1; woodland suitability group 7.)

Musella stony clay loam, 10 to 15 percent slopes, severely eroded (MwD3).—This soil has lost most, or all, of the original surface soil and some of the subsoil through erosion. The surface layer of dark-red stony clay loam is underlain by red and reddish-yellow clay loam. Small gullies have formed, and many of these are getting larger. Some gullies are too deep for farm equipment to cross. In the northwestern part of the county, a total of about 10 acres is only slightly eroded and about 19 acres is on slopes of 6 to 10 percent.

This soil has a thin root zone and is generally in poor tilth. The water-supplying capacity is moderate to low, and surface runoff is rapid. Erosion is a very severe hazard.

This soil is not suited to cultivation; it is suited only to pasture and trees. Yields are low even under good management. Most of the acreage is wooded. (Capability unit VIe–1; woodland suitability group 6.)

Porters Series

The Porters series consists of strongly sloping to very steep soils that are well drained to somewhat excessively drained and strongly acid. These soils have formed on mountainous ridgetops in material weathered from granite and gneiss. The surface layer is dark yellowish-brown to strong-brown loam and is about 7 inches thick. It is underlain by a thin layer of brown to dark-brown clay loam. Some areas of this soil are stony.

Porters soils occur with the Ashe, Cecil, and Watauga soils. They are browner and finer textured than the Ashe soils and are not so well developed or so deep as are the Cecil soils. The Porters soils are not so micaceous as the Watauga soils, which formed mainly in material weathered from mica schist.

The Porters soils in this county are in the northern part. Their native vegetation consisted of hardwoods, mainly oak, hickory, and poplar and some gum and maple. The soils are mainly in trees of poor quality. Many areas have been cut over, but none have been cleared for cultivation.

Porters loam, 10 to 15 percent slopes (PcD).—This soil is well drained to somewhat excessively drained and strongly acid. It occurs in the mountainous area in the northern part of the county. The major horizons in the profile are—

0 to 8 inches, dark yellowish-brown to strong-brown, very friable loam.
8 to 16 inches, brown to dark-brown clay loam; weak, subangular blocky structure.
16 to 36 inches, brown to dark-brown loam.
36 inches +, rock or large boulders.

The upper part of the surface layer ranges from dark yellowish brown to dark brown. The subsoil ranges from dark brown to brown and strong brown. This soil includes a few small areas that are deeper to bedrock than normal.

Tilth is generally fair, and the root zone is moderately thick. The water-supplying capacity is moderate, and surface runoff is slow to medium. Erosion is a severe hazard.

This soil is not suited to frequent cultivation, but under careful management it can be used for cultivated crops 1 year in 5 or 6. It is best suited to legumes, tree fruits, hay, and pasture. All of the acreage is wooded. (Capability unit IVe–1M; woodland suitability group 10.)

Porters loam, 15 to 25 percent slopes (PcE).—The surface layer of this soil is dark yellowish-brown and strong-brown loam, about 7 inches thick. It is underlain by a thin layer of brown to dark-brown clay loam.

Tilth is generally fair, and the root zone is thin. The water-supplying capacity is moderate, and surface runoff is medium. Erosion is a severe hazard.

This soil is not suited to cultivation. It is best suited to legumes, tree fruits, hay, and pasture. Most of the acreage is wooded. (Capability unit VIe–2; woodland suitability group 10.)

Porters loam, 25 to 60 percent slopes (PcF).—This soil has a surface layer of dark yellowish-brown to strong-brown loam that is about 6 inches thick. The subsoil is thin, brown to dark-brown clay loam. Rock outcrops are common. Included are small areas that are deeper to bedrock than this soil.

This soil has a thin root zone and is generally in fair tilth. It has medium to rapid surface runoff and a moderate capacity to supply water to plants. Erosion is a very severe hazard.

All of this soil is wooded and should not be cleared. It is too erosive and steep for cultivation. (Capability unit VIIe–1; woodland suitability group 12.)

Porters loam, 60 to 80 percent slopes (PcG).—This very steep soil has a dark yellowish-brown to strong-brown surface soil that is about 5 inches thick. The subsoil is a thin layer of brown to dark-brown clay loam.

This soil has a moderate water-supplying capacity, rapid surface runoff, and a very severe hazard of erosion. It is best suited to trees and is mostly wooded. (Capability unit VIIe–1; woodland suitability group 15.)

Porters-Ashe stony loams, 15 to 25 percent slopes (PAE).—These stony loams are so closely intermingled that it was not practical to map them separately. They are well drained to excessively drained and strongly acid. Bedrock is near the surface.

These soils are mostly in the northern part of the county. The Porters soils, which make up about 75 percent of the acreage, are browner, finer textured, and deeper than the Ashe soils. The Ashe soils occur mostly on side slopes, especially on projections between draws. They are more friable, lighter in color, and more gritty than the Porters soils.

The major horizons in the Porters soils are—

0 to 11 inches, very dark brown stony loam grading to dark-brown light clay loam in the lower part.
11 to 19 inches, dark reddish-brown, friable light clay loam; weak, subangular blocky structure; about 20 percent of horizon is stones and gravel.
19 to 36 inches, brown to dark-brown light clay loam.

The major horizons in the Ashe soils are—

0 to 4 inches, grayish-brown stony loam.
4 to 10 inches, olive-gray, very friable fine sandy loam; contains a few soft stones and mica flakes.
10 to 70 inches +, pale-yellow and white, soft gneissic rock that crumbles under slight pressure.

Included are areas that resemble the Ashe and the Cecil soils in color and texture. Rock outcrops are common, and any of the horizons described may be stony.

Porters-Ash stony loams, 15 to 25 percent slopes, are shallow and respond poorly to good management. Tilth is generally poor. Because these soils are moderately steep, very erosive, stony, and shallow, they are not suited to cultivation. They are suited only to trees, and all of the acreage is wooded. (Capability unit VIIs–1; woodland suitability group 7.)

Porters-Ashe stony loams, 25 to 60 percent slopes (PAF).—These soils have a surface layer of dark-brown, grayish-brown, or olive-gray stony loam that is about 10 inches thick. A dark reddish-brown clay loam subsoil, about 9 inches thick, occurs in some places but is absent in others. The underlying material is stony.

These soils have a very thin to thin root zone, a low to moderate water-supplying capacity, and rapid surface runoff. Erosion is a very severe hazard. The soils are too steep, stony, and shallow to be of much use except for trees. All of the acreage is wooded. (Capability unit VIIe–2; woodland suitability group 12.)

Porters-Ashe stony loams, 60 to 95 percent slopes (PAG).—The surface layer of these soils is dark-brown, grayish-brown, or olive-gray stony loam that is about 10 inches thick. It is underlain by a layer of dark reddish-brown clay loam. This layer is commonly about 7 inches thick, but in many places it is thinner or is absent. The underlying material is stony.

The Porters soil makes up about three-fourths of the acreage, and the Ashe soil makes up the rest. The Ashe soil is on side slopes and on projecting shoulders between draws.

These soils have a very thin to thin root zone, a low to moderate water-supplying capacity, and rapid surface runoff. Erosion is a very serious hazard. The soils are too steep, stony, and shallow to be of much value except for trees. All of the acreage is wooded. (Capability unit VIIe–2; woodland suitability group 15.)

Roanoke Series

The Roanoke series consists of nearly level, poorly drained, strongly acid soils. These soils have developed on low stream terraces in general alluvium. They have a very shallow surface layer of dark grayish-brown fine sandy loam. Their subsoil is light olive-brown fine sandy clay loam to silty clay loam that grades to light greenish-gray, highly mottled silty clay loam.

The Roanoke soils are in the same catena as the Wickham, Altavista, and Augusta soils. They are less red than the well-drained Wickham soils. They are more mottled than the moderately well drained Altavista soils and the somewhat poorly drained Augusta soils. The Altavista and Augusta soils are yellow or light brown instead of red.

In this county the Roanoke soils are in small, scattered areas along streams. Their native vegetation was hardwoods, mainly oak, hickory, and poplar and some gum and maple. Many areas have been cleared and cultivated. Some fields have been abandoned, however, and are reverting to alder and water-tolerant weeds.

Most of the acreage of these soils is in pasture, but a few fields are cultivated. Because these soils are poorly drained, many row crops are not well suited and generally produce only moderate to low yields.

Only one Roanoke soil was mapped in this county.

Roanoke fine sandy loam (0 to 2 percent slopes) (Roa).—This is a poorly drained, strongly acid soil on low stream terraces. The major horizons in the profile are—

0 to 4 inches, dark grayish-brown fine sandy loam.
4 to 14 inches, light olive-brown fine sandy clay loam to silty clay loam mottled with grayish brown; weak, angular blocky structure.
14 to 36 inches +, light greenish-gray silty clay loam to silt loam highly mottled with olive yellow and yellowish red.

The surface layer ranges from light grayish brown to dark gray. This soil has a thin root zone and is generally in poor tilth. The water-supplying capacity is low, and surface runoff and permeability are slow.

Poor drainage restricts the use of this soil mainly to pasture, hay, and trees. Most of the acreage is in pasture. Where drainage is adequate, corn and grain sorghum produce moderate yields. Undrained areas are poorly suited to row crops. (Capability unit IVw–2; woodland suitability group 16.)

Tusquitee Series

The Tusquitee series consists of gently sloping to strongly sloping, moderately well drained to well drained, strongly acid soils. These soils have formed at the base of slopes in local alluvium and colluvium. This material has washed from higher lying areas of Cecil, Porters, Halewood, and Ashe soils. The surface layer of the Tus-

quitee soils is dark grayish-brown loam and is about 9 inches thick. It is underlain by a layer of yellowish-brown to strong-brown clay loam. These soils vary in color and in depth to residual material.

In this county the Tusquitee soils are in the northern part. Their native vegetation was hardwoods, mainly oak, hickory, and poplar and some gum and maple. Many areas have been cleared and cultivated. Some of these areas have been abandoned, however, and have reverted to hardwood brush and to Virginia pine and shortleaf pine. Most of the acreage of these soils is wooded, but a few areas are cultivated or in pasture.

Tusquitee loam, 2 to 6 percent slopes (T1B).—This moderately well drained to well drained, strongly acid soil is in local alluvium at the base of slopes. The major horizons in the profile are—

0 to 9 inches, yellowish-brown, very friable loam.
9 to 26 inches, yellowish-brown to strong brown, friable clay loam; moderate, subangular blocky structure.
26 to 46 inches, yellowish-brown loam.

This soil ranges from 2 feet to several feet in thickness and, in places, is micaceous. It varies in color according to the kind of parent material and the content of organic matter. In wooded areas the surface layer ranges from yellowish brown to very dark grayish brown, and the subsoil, from yellowish brown to dark brown. In the northern part of the county, small, scattered, eroded areas are included with this soil. These inclusions cover about 182 acres.

This soil has a thick root zone and is generally in good tilth. The water-supplying capacity is moderate, and surface runoff is slow.

This soil is suited to frequent cultivation and to a wide range of plants. It responds well to good management. Almost all of the common crops can be grown, but erosion is a slight to moderate hazard in cultivated fields. Among the crops best suited are corn, winter legumes, tree fruits, hay, pasture, and trees. Yields are moderate to high. Most of the acreage is wooded. (Capability unit IIe–1M; woodland suitability group 4A.)

Tusquitee loam, 6 to 10 percent slopes (T1C).—The surface layer of this soil is dark yellowish brown and is about 9 inches thick. It is underlain by a layer of yellowish-brown to strong-brown clay loam, about 15 inches thick.

The soil contains a moderately thick to thick root zone and is generally in good tilth. The water-supplying capacity is moderate, and surface runoff is slow to medium. Erosion is a moderate hazard.

This soil responds well to good management and is suited to a wide range of plants. Because it is erosive, however, close-growing crops should be grown at least 4 years in 6. This soil is suited to most crops grown in the county, but it is mostly in trees. Yields are moderate. (Capability unit IIIe–1M; woodland suitability group 4A.)

Tusquitee loam, 6 to 10 percent slopes, eroded (T1C2)—This soil has a yellowish-brown surface layer that is about 5 inches thick. The subsoil is yellowish-brown to strong-brown clay loam and is about 15 inches thick. A few gullies have formed in places.

The tilth of this soil is generally fair, and the root zone is moderately thick to thick. The water-supplying capacity is moderate, surface runoff is medium to slow, and erosion is a moderate hazard.

This soil responds well to good management and is suited to a wide range of plants. Because of the erosion hazard, the soil should be kept in close-growing crops two-thirds of the time. Row crops should not be grown more than 2 years in succession. Suitable crops are corn, winter legumes, tree fruits, hay, pasture, and trees. Most of the acreage is in pasture. (Capability unit IIIe–1M; woodland suitability group 4A.)

Tusquitee loam, 10 to 15 percent slopes (T1D).—The surface layer of this soil is dark yellowish brown and is about 8 inches thick. It is underlain by yellowish-brown to strong-brown clay loam, about 13 inches thick.

Tilth is generally fair in this soil, and the root zone is moderately thick to thick. The water-supplying capacity is moderate, surface runoff is medium to slow, and erosion is a severe hazard.

This soil responds fairly well to good management, but it is too steep and erosive for frequent cultivation. Under careful management row crops can be grown 1 year in 5 or 6, but the better suited crops are winter legumes, tree fruits, hay, pasture, and trees. Most of the acreage is in trees. (Capability unit IVe–1M; woodland suitability group 4A.)

Tusquitee loam, 10 to 15 percent slopes, eroded (T1D2).—The yellowish-brown surface layer of this soil is about 5 inches thick. It is underlain by a layer of yellowish-brown to strong-brown clay loam, about 13 inches thick. A few gullies have formed in places.

This soil has a moderately thick root zone and is generally in fair tilth. The capacity to supply water to plants is moderate to low. Surface runoff is medium, and the hazard of erosion is severe.

Because it is strongly sloping and very erosive, this soil is not suited to frequent cultivation. Under careful management it can be used for row crops 1 year in 5 or 6. It is best suited to legumes, tree fruits, hay, pasture, and trees. Most of the acreage is in pasture. (Capability unit IVe–1M; woodland suitability group 4A.)

Tusquitee stony loam, 6 to 10 percent slopes (TmC).—This soil has a thin, dark yellowish-brown stony loam surface soil. The subsoil is yellowish-brown fine sandy loam, about 24 inches thick. The root zone is moderately thick, but tilth is generally very poor. The water-supplying capacity is high, and surface runoff is slow. Erosion is a moderate hazard.

Farm implements cannot be used on most of this stony soil, though some places that contain fewer stones can be kept in hay. Pasture and trees are the only suitable uses, and most of the acreage is in trees. (Capability unit VIe–1; woodland suitability group 4A.)

Tusquitee stony loam, 10 to 15 percent slopes (TmD).—The surface layer of this soil is dark yellowish-brown stony loam, about 8 inches thick. The subsoil is yellowish-brown fine sandy loam and is about 22 inches thick.

Tilth is generally very poor, and the root zone is moderately thick to thin. The water-supplying capacity is high, surface runoff is medium, and the susceptibility to erosion is severe.

This soil is too sloping and too stony for cultivation. It is best suited to pasture and trees, and most of the acreage is wooded. (Capability unit VIe–1; woodland suitability group 4A.)

Watauga Series

The Watauga series consists of moderately steep and steep, well-drained, strongly acid soils. These soils have formed on uplands in material weathered from mica schist containing admixtures of gneiss. The surface layer is brownish-yellow loam and is about 11 inches thick. It is underlain by yellowish-brown to strong-brown clay loam, about 14 inches thick.

These soils are associated with the Chandler soils. They are generally on milder slopes than the Chandler soils and are somewhat better developed. Watauga soils are much paler than Madison soils, particularly in the subsoil.

In this county the Watauga soils are in small areas in the northern part. Their native vegetation consisted of hardwoods, mainly oak, chestnut, hickory, poplar, gum, and maple. A few areas have been cut over, but none have been cleared for cultivation. The cutover areas have reverted to Virginia pine and shortleaf pine. Watauga soils generally produce moderate to high yields of forest products.

Watauga loam, 15 to 25 percent slopes (WaE).—This soil is well drained and strongly acid. It occurs on uplands in the northern part of the county. The major horizons in the profile are—

0 to 11 inches, brownish-yellow, very friable loam; olive to a depth of 2 inches in most places.
11 to 20 inches, yellow-brown to strong-brown, friable to firm clay loam; moderate, subangular blocky structure.
20 to 25 inches, yellowish-red clay loam; half the layer consists of mica flakes.
25 to 33 inches +, red mica schist.

The content of mica and of quartz fragments and the thickness of this soil vary from place to place. Included with this soil and totaling about 85 acres are soils on slopes of 10 to 15 percent.

This soil has a moderately thick root zone and is generally in fair tilth. The water-supplying capacity is moderate, and surface runoff is medium. Erosion is a severe hazard.

Because it is on strong, erosive slopes, this soil is not suited to cultivation but should be kept in pasture or trees. Yields are moderate. Most of the acreage is wooded. (Capability unit VIe–2; woodland suitability group 5.)

Watauga loam, 25 to 60 percent slopes (WaF).—This soil has a surface layer of olive to brownish-yellow loam, about 9 inches thick. The subsoil is yellowish-brown to strong-brown clay loam and is about 8 to 12 inches thick.

This soil has a moderately thick root zone and is generally in fair tilth. Surface runoff is medium, and the capacity to supply water to plants is moderate.

Steep slopes and a severe erosion hazard limit the use of this soil mainly to trees. The soil is too erosive to be left bare at any time, and most of the acreage is wooded. Yields are moderate. (Capability unit VIIe–1; woodland suitability group 12.)

Wehadkee Series

The Wehadkee series consists of nearly level, poorly drained, strongly acid soils that have developed on flood plains in recent alluvium. In most places the surface layer is overwash of reddish-brown silt loam, about 6 inches thick. The underlying material is dark grayish-brown silt loam to silty clay loam that it mottled with yellowish red.

These soils are the poorly drained members of the Congaree-Chewacla-Wehadkee catena, which occurs on flood plains. Wehadkee soils are flooded more frequently than the Roanoke soils, which are on low stream terraces.

In this county the Wehadkee soils are in small, scattered areas along the large streams. Their original vegetation was hardwoods, mainly poplar, gum, and maple, but many areas have been cleared and cultivated. Some of these areas have been abandoned and have reverted to poplar and alder.

Most of the acreage is in trees, which is probably the best use. Some parts are cultivated or in pasture. Pasture crops are suitable in drained areas, but corn generally produces only moderate to low yields.

Only one Wehadkee soil was mapped in this county.

Wehadkee silt loam (0 to 2 percent slopes) (Wea).—This soil is poorly drained and strongly acid. It is on bottom lands that are likely to be flooded. The major horizons in the profile are—

0 to 6 inches, reddish-brown, slightly plastic silt loam.
6 to 27 inches, dark grayish-brown, slightly plastic silt loam to silty clay loam; mottling increases with depth.
27 to 36 inches, very dark gray silt loam.

Overwash on this soil is 6 inches thick and is underlain by a layer that varies in thickness. The lower part of the profile is waterlogged and is of extremely varied texture. In some included areas the surface soil is fine sandy loam to silty clay loam. Other areas, totaling about 31 acres, have a surface layer of dark-brown to black, mottled silt loam that is underlain by very dark gray clay loam and silt loam.

Tilth is generally poor, and yields are low. Because the water table is high, drainage is difficult and the root zone is restricted. The water-supplying capacity is moderate, and surface runoff is very slow. Though erosion is only slight, floods may cause damage by scouring and deposition.

Because drainage is poor and flooding is likely, this soil is suited to only a few crops. It responds poorly to management. It is best suited to sod crops and trees. Most of the acreage is wooded. (Capability unit IVw–1; woodland suitability group 16.)

Wickham Series

The Wickham series consists of gently sloping and sloping, well-drained, strongly acid soils. These soils have formed on stream terraces in old alluvium. In most places the surface layer is dark grayish-brown fine sandy loam and is about 8 inches thick. It is underlain by yellowish-red to reddish-yellow sandy clay to sandy clay loam, 20 inches or more thick.

These soils are the reddest and best drained members of the Wickham-Altavista-Augusta-Roanoke catena, which is on stream terraces. They resemble the Hiwassee soils but are on lower and less sloping terraces and are brighter red than Hiwassee soils. Wickham soils are darker colored than the Masada soils and are on lower, less sloping terraces.

In this county the Wickham soils are in small, scattered areas near the large streams. Their original vegetation consisted of hardwoods, mainly oak, hickory,

chestnut, and poplar and some gum and maple. Many areas have been cleared and are cultivated, but some of these have been abandoned and have reverted to Virginia pine and shortleaf pine. Most of the acreage is in pasture, but many small areas are cultivated or are in trees.

Wickham fine sandy loam, 2 to 6 percent slopes, eroded (WgB2).—This is a well-drained, strongly acid soil on stream terraces. It has formed in old alluvium. The major horizons in the profile are—

0 to 8 inches, dark grayish-brown, very friable fine sandy loam.
8 to 38 inches, yellowish-red to reddish-yellow, firm to friable sandy clay to sandy clay loam; moderate, angular blocky structure.
28 to 36 inches +, brownish-yellow sandy loam mottled with very pale brown.

The deposits of old alluvium are several feet thick in places. The subsoil ranges from brown to reddish yellow and red. Included with the soil in the northeastern part of the county are areas of a similar but thicker soil that total about 55 acres. In these inclusions the parent material contains a large amount of fine sand. A few gullies have formed in places.

The tilth of this soil is generally good, and the root zone is thick. The water-supplying capacity is moderate, and surface runoff is slow. Erosion is a slight to moderate hazard.

This soil responds well to good management and is suited to almost all of the crops commonly grown in the county. It should be kept in close-growing crops at least half the time and in row crops not more than 2 years in succession. Most of this soil is cultivated. Suitable crops are corn, pimento pepper, winter legumes, tree fruits, hay, pasture, and trees. (Capability unit IIe–1; woodland suitability group 4A.)

Wickham fine sandy loam, 6 to 10 percent slopes, eroded (WgC2).—The surface layer of this soil is dark grayish-brown fine sandy loam and is about 8 inches thick. The subsoil consists of yellowish-red to reddish-yellow sandy clay, 20 inches or more thick. There are a few gullies in places.

Areas of a thicker soil are included that contain a large amount of fine sand in the parent material. These inclusions are in the northeastern part of the county and total about 50 acres.

This soil has a moderately thick to thick root zone and is generally in good tilth. It can supply a moderate amount of water to plants. Surface runoff is slow, and erosion is a moderate hazard.

This soil responds well to good management and is suited to a wide range of plants. Because of the erosion hazard, the soil should be kept in close-growing crops at least two-thirds of the time and should not be planted to row crops more than 2 years in succession. Yields are high. (Capability unit IIIe–1; woodland suitability group 4A.)

Wickham clay loam, 6 to 10 percent slopes, severely eroded (WhC3).—This soil has lost through erosion most or all of the original surface layer and part of the subsoil. The present surface layer consists chiefly of the upper part of the subsoil. It is strong-brown to yellowish-red clay loam, about 6 inches thick. In many places small gullies have formed, and many of them are getting larger. Some gullies are too deep for farm equipment to cross.

The root zone in this soil is moderately thick, but tilth is generally poor. The water-supplying capacity is moderate to low, and surface runoff is medium to rapid. Erosion is a severe hazard.

This soil responds fairly well to good management and can be planted to row crops once in 4 to 6 years if management is good. It is best suited to legumes, tree fruits, hay, pasture, and trees. Yields are low. (Capability unit IVe–2; woodland suitability group 3.)

Use and Management of Soils for Crops

This section consists of two main parts. In the first part, the nationwide system of capability classification is explained, and the management of soils by capability units, or management groups, is discussed. The second part consists of a table that lists, for each soil in the county under two levels of management, estimated yields of crops commonly grown.

The succeeding sections discuss the uses of soils for woodland and for engineering purposes.

Capability Groups of Soils

The capability classification is a grouping that shows, in a general way, how suitable soils are for most kinds of farming. It is a practical grouping based on limitations of the soils, on the risk of damage when they are used, and on the way they respond to treatment.

In this system all the kinds of soil are grouped at three levels, the capability class, subclass, and unit. Eight capability classes are in the broadest grouping and are designated by Roman numerals I through VIII. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other seven classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, shallow, or otherwise limited that they do not produce worthwhile yields of crops, forage, or wood products.

The subclasses indicate major kinds of limitations within the classes. Within most of the classes there can be as many as four subclasses. The subclass is indicated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless a close-growing plant cover is maintained; *w* means that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the country, indicates that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few or no limitations. Class V can contain, at the most, only subclasses *w*, *s*, and *c*, because the soils in it are not susceptible to erosion or are only slightly susceptible. The soils in class V, however, have other limitations that limit their use largely to pasture, range, woodland, or wildlife.

Within the subclasses are the capability units, which are groups of soils enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping of soils for making many statements about the management of soils. Capability units are generally identified by numbers assigned locally, for example, IIe–1 or IIIe–2.

Soils are classified in capability classes, subclasses, and units in accordance with the degree and kind of their permanent limitations but without consideration of major and generally expensive landforming or reclamation.

None of the soils in Habersham County have been placed in class V or class VIII. The classes, subclasses, and capability units used in this county are described in the list that follows.

Class I.—Soils with few limitations that restrict their use.
- Capability unit I–1: Well-drained, nearly level to gently sloping soils around the head of draws and in depressions on uplands.
- Capability unit I–2: Moderately well drained, level soil on low stream terraces.

Class II.—Soils with some limitations that reduce the choice of plants or require moderate conservation practices.
- Subclass IIe: Soils subject to moderate erosion if they are not protected.
  - Capability unit IIe–1: Well-drained, gently sloping soils with a friable to firm, clayey subsoil; on uplands and stream terraces.
  - Capability unit IIe–1M: Moderately well drained to well drained, gently sloping soils in mountains.
  - Capability unit IIe–2: Moderately well drained to well drained, gently sloping soils with a yellow to yellowish-brown and strong-brown subsoil; on uplands and stream terraces.
- Subclass IIw: Soils that have moderate limitations because of excess water.
  - Capability IIw–2: Moderately well drained to well drained, nearly level soils on flood plains that are subject to occasional flooding.

Class III.—Soils with severe limitations that reduce the choice of plants, or require special conservation practices, or both.
- Subclass IIIe: Soils subject to severe erosion if they are cultivated and not protected.
  - Capability unit IIIe–1: Well-drained, gently sloping to sloping soils with a firm, reddish, clayey subsoil; on uplands and stream terraces.
  - Capability unit IIIe–1M: Well drained to moderately well drained, sloping soils in mountains.
  - Capability unit IIIe–2: Well-drained, sloping soils with a yellow to yellowish-brown and strong-brown subsoil; on uplands and stream terraces.
- Subclass IIIw: Soils that are severely limited by excess water.
  - Capability unit IIIw–2: Somewhat poorly drained, nearly level soils on bottom lands and along drainageways; frequently flooded for short periods.
  - Capability unit IIIw–3: Somewhat poorly drained, gently sloping to level soils on uplands and low stream terraces.
- Subclass IIIs: Soils that have severe limitations of moisture capacity or other soil features.
  - Capability unit IIIs–1: Droughty, sandy soils on bottom lands that are flooded occasionally.

Class IV.—Soils with very severe limitations that restrict the choice of plants, require very careful management, or both.
- Subclass IVe: Soils subject to very severe erosion if they are cultivated and not protected.
  - Capability unit IVe–1: Well-drained, strongly sloping soils with a dominantly reddish, clayey subsoil.
  - Capability unit IVe–1M: Moderately well drained to somewhat excessively drained, strongly sloping soils in mountains.
  - Capability unit IVe–2: Well-drained, sloping and strongly sloping, severely eroded soils on uplands.
- Subclass IVw: Soils that are very severely limited for cultivation because of excess water.
  - Capability unit IVw–1: Poorly drained, nearly level soils on flood plains that are subject to frequent or prolonged flooding.
  - Capability unit IVw–2: Poorly drained, nearly level soils on low stream terraces subject to occasional flooding.

Class VI.—Soils with very severe limitations that make them generally unsuitable for cultivation and that limit their use largely to grazing, woodland, or wildlife food and cover.
- Subclass VIe: Soils severely limited, chiefly by risk of erosion if protective cover is not maintained.
  - Capability unit VIe–1: Generally well-drained, sloping to moderately steep, stony soils that are fairly shallow over bedrock.
  - Capability unit VIe–2: Well-drained and somewhat poorly drained, sloping to moderately steep soils that are slightly to severely eroded.
  - Capability unit VIe–3: Well-drained and somewhat excessively drained, strongly sloping soils that are shallow over bedrock.

Class VII.—Soils with very severe limitations that make them unsuitable for cultivation without major reclamation, and that restrict their use largely to grazing, woodland, or wildlife.
- Subclass VIIe: Soils very severely limited, chiefly by risk of erosion if cover is not maintained.
  - Capability unit VIIe–1: Generally well-drained, strongly sloping to very steep soils on uplands and in mountains.
  - Capability unit VIIe–2: Well-drained to excessively drained, strongly sloping to very steep, shallow to moderately shallow soils on uplands and in mountains.
- Subclass VIIs: Soils very severely limited by stones, moisture capacity, or other soil features.
  - Capability unit VIIs–1: Well-drained and somewhat excessively drained, stony, strongly sloping to steep soils that are shallow and somewhat droughty.

Management by capability units [1]

In this subsection the soils of Habersham County have been grouped in 23 capability units so that statements about management can be made more easily. The soils in any one unit need about the same kind of management, respond to management in about the same way, and have essentially the same limitations.

For each capability unit, the soils in the unit are described as a group and listed individually. Then management is suggested for the soils in the unit. Each soil is described in more detail in the section "Description of Soils." For specific suggestions about the amounts and kinds of fertilizer to use on each soil, see your county agricultural agent or the local representative of the Soil Conservation Service.

CAPABILITY UNIT I-1

Congaree soils, local alluvium—the only soils in this capability unit—are well drained. They are in depressions and around the head of draws on nearly level to gently sloping uplands. The surface layer of very friable fine sandy loam extends to a depth of about 12 to 15 inches. It is underlain by friable loam to sandy clay loam that transmits water freely.

These soils contain a moderate amount of organic matter and are generally in good tilth. They have a thick root zone and a high water-supplying capacity. They are moderate to high in natural fertility and are strongly acid.

These soils are in small, scattered areas. About 70 percent of the acreage is cultivated, 15 percent is wooded, and 15 percent is in pasture or some other use.

If fertility and organic matter are maintained, these soils can be cultivated continuously. They are suited to corn, cotton, truck crops, and small grain. Plants suitable for hay and pasture are crimson, ladino, and white clovers, Coastal and common bermudagrasses, tall fescue, annual and sericea lespedezas, and dallisgrass.

To maintain high yields, apply lime and a complete fertilizer. Add organic matter by returning crop residue to the soils. These soils are easily seeded, and crops on them are easy to harvest.

Suitable cropping systems—

1. Corn interplanted with a summer legume and followed by a winter legume.
2. *First year*, corn followed by a winter legume. *Second year*, grain sorghum.

Dig ditches or build terraces to protect these soils against runoff from higher areas. On vegetated waterways apply seed and fertilizer at twice the rate ordinarily applied for pasture. Till on the contour. If water is available, the irrigation of selected crops is practical. Because these soils are in small areas, management may be difficult.

These soils provide good sites for wildlife habitats. Bicolor and sericea lespedezas can be grown for food and cover, but these plants need fertilizer.

CAPABILITY UNIT I-2

Altavista fine sandy loam, 0 to 2 percent slopes, is the only soil in this capability unit. This is a moderately well drained soil on low stream terraces. It is level or nearly level and is not susceptible to erosion. The surface layer is friable sandy loam, about 9 inches thick. It is underlain by friable clay loam that slightly restricts the movement of water.

This soil contains little organic matter but is generally in good tilth. It has a thick root zone and a moderate water-supplying capacity. It is moderate in natural fertility and is strongly acid.

This soil is in small, scattered areas. About 15 percent of the acreage is cultivated; 5 percent is wooded; and 80 percent is in pasture, is in some other use, or is idle.

If fertility and organic matter are maintained, this soil can be cultivated continuously. It is suited to corn, cotton, truck crops, and small grain but is not suited to wheat. Plants suitable for hay and pasture are ladino, white, and crimson clovers, Coastal and common bermudagrasses, tall fescue, and dallisgrass. Alfalfa and other crops that are sensitive to wetness do not thrive.

For continued high yields, apply moderate amounts of a complete fertilizer and lime and leave all crop residue on the surface. It is especially important to maintain the soil structure and to keep the soil porous. This soil is easy to seed, and crops on it are easy to harvest.

Suitable cropping systems—

1. *First year*, cotton followed by a winter legume. *Second year*, grain sorghum.
2. Corn interplanted with a summer legume and followed by a winter legume.

Crop rows should be on the contour. If water is available, the irrigation of selected crops is feasible.

This soil provides good sites for wildlife habitats. Plant field borders of bicolor and sericea lespedezas between cropland and woods, along fences, or at turnrows. To establish and maintain the cover, apply adequate fertilizer.

CAPABILITY UNIT IIe-1

This unit consists of well-drained, gently sloping, moderately eroded soils on uplands and stream terraces. The surface layer of these soils is friable sandy loam to loam. The subsoil is friable to firm, moderately permeable, and clayey.

These soils contain little organic matter, but most of the acreage is in good tilth. The root zone is thick, and the water-supplying capacity is moderate. Natural fertility is moderate, and the soils are strongly acid. The soils in this unit are—

Cecil sandy loam, 2 to 6 percent slopes, eroded.
Hiwassee fine sandy loam, 2 to 6 percent slopes, eroded.
Lloyd loam, 2 to 6 percent slopes, eroded.
Madison fine sandy loam, 2 to 6 percent slopes, eroded.
Wickham fine sandy loam, 2 to 6 percent slopes, eroded.

About 60 percent of the acreage of these soils is cultivated, 20 percent is in woods, and 20 percent is in pasture or some other use.

These soils produce good yields of all crops commonly grown in the county. Row crops can be cultivated safely for 2 years in 4, in a cropping system that includes a close-growing crop. Suitable crops are corn, cotton, pimento pepper, small grain, and grain sorghum. Plants suitable for hay and pasture are ladino, white, and crimson clovers, alfalfa, tall fescue, lespedeza, Coastal and common bermudagrasses, and dallisgrass.

[1] This section was written by J. N. NASH, conservation agronomist, SCS, and S. M. ROBERTSON, soil scientist, SCS.

These soils need moderate amounts of a complete fertilizer and of lime. Add organic matter by returning crop residue to the soils.

Suitable cropping systems—

1. *First year,* small grain and lespedeza. *Second year,* volunteer lespedeza. *Third and fourth years,* cotton or corn or a row crop followed by a winter legume.
2. *First year,* small grain and lespedeza. *Second year,* cotton or corn.

Cultivated areas require a complete water-disposal system that provides contour cultivation and vegetated waterways. Stripcropping and terracing are required in some places. If water is available, the irrigation of selected crops is feasible. Fieldwork is not difficult on these soils.

These soils provide good sites for wildlife habitats. Plant field borders of bicolor and sericea lespedezas between cropland and woods, along fences, or at turnrows. To establish and maintain the cover, apply adequate fertilizer.

CAPABILITY UNIT IIe-1M

Tusquitee loam, 2 to 6 percent slopes, is the only soil in this capability unit. This gently sloping soil is moderately well drained to well drained. It has formed at the base of steep mountain slopes in material that has washed from higher areas. The surface layer is friable loam, about 9 inches thick. The subsoil is friable clay loam that, in places, restricts the movement of water.

This soil contains varied amounts of organic matter and is in good tilth. It has a thick root zone and a moderate water-supplying capacity. It is moderate in natural fertility and is strongly acid.

Areas of this soil are small and scattered. About 15 percent of the acreage is cultivated, 75 percent is wooded, and 10 percent is in pasture or some other use.

This soil is suited to most of the crops commonly grown in this county except cotton and alfalfa. It is best suited to corn, small grain, grain sorghum, and truck crops. Plants suitable for hay and pasture are ladino, white, and crimson clovers, tall fescue, sericea and annual lespedezas, Coastal and common bermudagrasses, and dallisgrass.

Close-growing crops should be seeded every other year. This soil needs moderate amounts of a complete fertilizer and of lime. Return crop residue to the soil to supply organic matter. To increase fertility as well as organic matter, use a cropping system that includes summer and winter legumes.

Suitable cropping systems—

1. *First year,* a small grain and lespedeza. *Second year,* corn interplanted with a summer legume.
2. *First year,* oats and rye. *Second year,* lespedeza followed by a winter cover crop.
3. *First year,* a small grain followed by lespedeza. *Second year,* corn or grain sorghum followed by a winter legume.

A complete water-disposal system is needed. Terraces should drain to vegetated natural draws or to prepared outlets. To establish vegetation in waterways, seed and fertilize at twice the normal rates. All tilling should be done on the contour. Maintain vegetation by adding fertilizer and lime as needed. If water is available, the irrigation of selected crops is feasible.

This soil provides good sites for wildlife habitats. Plant field borders of bicolor and sericea lespedezas between cropland and woods, along fences, or at turnrows. To establish and maintain food and cover for wildlife, apply adequate fertilizer.

CAPABILITY UNIT IIe-2

This unit consists of moderately well drained to well drained, gently sloping soils that are slightly eroded to moderately eroded. These soils are in small, scattered areas on uplands and stream terraces. The surface soil is friable sandy loam. The subsoil of sandy clay loam or clay loam to sandy clay restricts the movement of water in some places.

These soils contain a moderate to small amount of organic matter and are generally in good tilth. They have a thick to moderately thick root zone and a moderate capacity for supplying water to plants. They are strongly acid. The natural fertility is low, but response to fertilizer is good. These soils warm up slowly in spring. They are—

Altavista fine sandy loam, 2 to 6 percent slopes.
Altavista fine sandy loam, 2 to 6 percent slopes, eroded.
Appling sandy loam, 2 to 6 percent slopes, eroded.
Habersham fine sandy loam, 2 to 6 percent slopes, eroded.
Halewood fine sandy loam, 2 to 6 percent slopes, eroded.
Masada fine sandy loam, 2 to 6 percent slopes, eroded.

About 30 percent of the acreage of these soils is cultivated, 10 percent is in woods, and 60 percent is in pasture or some other use.

These soils are well suited to corn, cotton, small grain, grain sorghum, and other crops. Plants suitable for hay and pasture are ladino, white, and crimson clovers, tall fescue, annual and sericea lespedezas, Coastal and common bermudagrasses, and dallisgrass. Alfalfa, wheat, and barley are not well suited.

Maintain organic matter and fertility by seeding summer and winter legumes and by applying fertilizer and lime liberally. Return all crop residue to the soil. Yields are normally high if enough fertilizer and lime are added and if the structure and porosity of the soil are maintained.

Suitable cropping systems—

1. *First year,* oats or rye followed by lespedeza. *Second year,* corn or grain sorghum followed by oats or lespedeza.
2. *First and second years,* small grain and lespedeza. *Third and fourth years,* cotton or corn.

A complete water-disposal system is needed. Terraces should drain to vegetated natural draws or to prepared outlets. To establish vegetation in waterways, apply seed and fertilizer at twice the normal rates. Till on the contour. Maintain vegetation by adding fertilizer and lime as needed. If water is available, the irrigation of selected crops is feasible.

These soils provide good sites for wildlife habitats. Plant field borders of bicolor and sericea lespedezas between cropland and woods, along fences, or at turnrows. To establish and maintain cover for wildlife, apply adequate fertilizer.

CAPABILITY UNIT IIw-2

This unit consists of moderately well drained to well drained, nearly level soils. These soils are on flood plains and are subject to flooding for short periods. The surface soil is very friable silt loam to sandy loam. Water moves freely through the underlying loamy material.

These soils contain a moderate to small amount of organic matter and are generally in good tilth. They have

a thick root zone and a moderate to moderately high water-supplying capacity. The natural fertility is moderate to low, and the soils are strongly acid. These soils are—

Alluvial land.
Congaree silt loam.

About 50 percent of the acreage of these soils is cultivated, 30 percent is wooded, and 20 percent is in pasture or some other use.

Corn and small grain are the best suited crops, but grain sorghum and truck crops are also grown. Plants suitable for pasture and hay are tall fescue, lespedeza, Coastal and common bermudagrasses, dallisgrass, and crimson, ladino, and white clovers. Cotton, wheat, and alfalfa are not well suited.

The soils in this group need liberal amounts of a complete fertilizer and of lime. Nitrogen should be added as a topdressing. To maintain organic matter, leave all crop residue on the surface.

Suitable cropping systems—

1. Summer vegetables followed by oats or rye.
2. Grain sorghum or corn; use shallow cultivation, lay by early, and plant winter legumes during the last cultivation; mow stubble and leave the residue on the surface all winter.

In some places these soils need protection from flooding. To help control runoff from upland areas, build diversion channels or ditches. Small areas may need open ditches or tile to improve the internal drainage. Irrigation is practical in fields planted to selected crops.

These soils provide good sites for wildlife habitats. Plant borders of bicolor lespedeza between cropland and woods, along fences, or at turnrows. Apply adequate fertilizer to establish and maintain food and cover for wildlife on these sites.

CAPABILITY UNIT IIIe-1

Capability unit IIIe–1 consists of deep, well-drained, gently sloping to sloping soils on uplands and stream terraces. These soils are slightly eroded to severely eroded. The surface layer is mainly friable sandy loam or fine sandy loam.

Generally, these soils can be kept in fair to good tilth; they supply a moderate amount of water to plants. Water moves freely through the friable, firm clay subsoil. The content of organic matter is low to moderate, natural fertility is low, and the reaction is strongly acid. These soils are—

Cecil sandy loam, 6 to 10 percent slopes.
Cecil sandy loam, 6 to 10 percent slopes, eroded.
Hiwassee fine sandy loam, 6 to 10 percent slopes, eroded.
Lloyd loam, 6 to 10 percent slopes.
Lloyd loam, 6 to 10 percent slopes, eroded.
Madison fine sandy loam, 6 to 10 percent slopes.
Madison fine sandy loam, 6 to 10 percent slopes, eroded.
Madison fine sandy clay loam, 2 to 6 percent slopes, severely eroded.
Wickham fine sandy loam, 6 to 10 percent slopes, eroded.

About 60 percent of the acreage of these soils is cultivated, 20 percent is in woods, and 20 percent is in pasture or some other use.

These soils are suited to all crops commonly grown in the county and can be safely cultivated to row crops 1 year in 3. Cotton, corn, pimento pepper, small grain, and grain sorghum are well suited. Suitable plants for hay and pasture are alfalfa, tall fescue, annual and sericea lespedezas, Coastal and common bermudagrasses, dallisgrass, and white and ladino clovers.

The soils in this group need liberal amounts of lime and of a complete fertilizer. Add nitrogen as a topdressing and, to maintain organic matter, leave all crop residue on the surface.

Suitable cropping systems—

1. *First year*, corn or grain sorghum; use shallow cultivation and lay by early; mow stubble after harvest and leave residue on surface through winter. *Second year*, small grain planted for seed and followed by tall fescue for grazing.
2. *First year*, cotton or pimento pepper followed by a small grain drilled through the mowed stubble; seed with lespedeza in spring. *Second and third years*, annual lespedeza seeded for hay.

A complete water-disposal system is needed on these soils. Terraces should drain to vegetated natural draws or to other prepared outlets. For vegetated waterways, apply twice the normal rates of seed and fertilizer. All farming should be on the contour. If water is available, irrigation is practical in fields planted to selected crops.

These soils provide good sites for wildlife habitats. Field borders of bicolor and sericea lespedezas are well suited between cropland and woods, along fences, or at turnrows. These borders will help to control erosion. Apply adequate fertilizer to establish and maintain food and cover for wildlife.

CAPABILITY UNIT IIIe-1M

This capability unit consists of well drained to moderately well drained, sloping soils that are slightly to moderately eroded. These soils are in small areas of colluvium in the mountains. The surface soil is very friable loam, and the subsoil is friable clay loam that, in places, slightly restricts the movement of water. Cobbles occur in some places but make up less than 10 percent of the soil volume.

These soils are generally in good tilth and have a moderately thick to thick root zone. Their water-supplying capacity is moderate. The content of organic matter is moderate to low, natural fertility is moderate, and the reaction is strongly acid. These soils are—

Tusquitee loam, 6 to 10 percent slopes.
Tusquitee loam, 6 to 10 percent slopes, eroded.

About 10 percent of the acreage of these soils is cultivated, 75 percent is in woods, and 15 percent is in pasture or some other use.

If fertility and organic matter are maintained, these soils are suited to most crops grown locally. They are not, however, suited to cotton and alfalfa. Close-growing crops should be grown 2 years in 3. Suitable field crops are corn, small grain, grain sorghum, and truck crops. Suitable plants for hay or pasture are tall fescue, annual and sericea lespedezas, Coastal and common bermudagrasses, and white and ladino clovers.

These soils need moderate amounts of a complete fertilizer and of lime. To maintain organic matter, leave all crop residue on the surface.

Suitable cropping systems—

1. *First year*, oats, rye, and tall fescue. *Second year through fourth year*, tall fescue seeded for hay, pasture, or seed. *Fifth year*, corn or grain sorghum followed by a winter legume. *Sixth year*, corn or grain sorghum; lay by early,

mow stubble after harvest, and leave residue on surface all winter.

2. *First through fourth year*, seed sericea lespedeza in spring of first year and let it grow through fourth year. *Fifth and sixth years*, corn or grain sorghum; use shallow cultivation and lay by early; mow stubble after harvest and leave residue on surface all winter.

A complete water-disposal system is needed on these soils. Terraces should drain to natural draws that have been grassed or to other prepared outlets. To establish vegetation in waterways, apply seed and fertilizer at twice the normal rates. All farming should be on the contour. If water is available, irrigation is practical in fields planted to selected crops.

Plant bicolor and sericea lespedezas along the field borders to protect the soils from erosion and to furnish food and cover for wildlife. At planting and at regular intervals, lime and fertilize the wildlife areas.

CAPABILITY UNIT IIIe-2

Capability unit IIIe-2 consists chiefly of well-drained, sloping soils that are slightly to moderately eroded. These soils are on uplands and stream terraces. Their surface soil is very friable fine sandy loam. The subsoil is sandy clay loam or clay loam to sandy clay that, in places, slightly restricts the movement of water. It is yellow to yellowish brown or strong brown.

Tilth is generally good, and the root zone is moderately thick to thick. The water-supplying capacity and content of organic matter are moderate to low and natural fertility is low. These soils are strongly acid. They are—

Appling sandy loam, 6 to 10 percent slopes, eroded.
Habersham fine sandy loam, 6 to 10 percent slopes.
Habersham fine sandy loam, 6 to 10 percent slopes, eroded.
Halewood fine sandy loam, 6 to 10 percent slopes.
Halewood fine sandy loam, 6 to 10 percent slopes, eroded.
Masada fine sandy loam, 6 to 10 percent slopes, eroded.

About 25 percent of the acreage of this group of soils is cultivated, 50 percent is in woods, and 25 percent is in pasture or some other use.

If fertility and organic matter are maintained, these soils are suited to most crops locally grown. They can be safely planted to row crops once in 3 years. Corn, cotton, small grain, and grain sorghum are well suited. Suitable pasture plants are tall fescue, annual and sericea lespedezas, Coastal and common bermudagrasses, and white and ladino clovers. Wheat and alfalfa are not suited.

These soils respond well to liberal amounts of a complete fertilizer. A close-growing crop should be grown 2 years in 3. To maintain organic matter, all crop residue should be left on the surface.

Suitable cropping system—

First year, corn or grain sorghum; use shallow cultivation and lay by early; mow stubble after harvest and leave the residue on the surface all winter. *Second year*, corn or grain sorghum followed by oats and tall fescue. *Third year*, oats for seed and tall fescue for hay. *Fourth year*, tall fescue for hay, grazing, or seed.

A complete water-disposal system is needed on these soils. Terraces should drain to natural draws that have been grassed or to other prepared outlets. To establish vegetation in waterways, apply seed and fertilizer at twice the normal rates. All farming should be on the contour. If water is available, irrigation is practical in fields planted to selected crops.

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Plant bicolor and sericea lespedezas along the field borders to protect these soils from erosion and to furnish food and cover for wildlife. To maintain the areas, apply lime and fertilizer regularly.

CAPABILITY UNIT IIIw-2

Capability unit IIIw-2 consists of moderately deep to deep, somewhat poorly drained, nearly level soils. These soils are on bottom lands and along drainageways. They have a seasonally high water table. Frequent floods of short duration scour these soils or cover them with fresh materials. The surface layer, therefore, is of varied texture, and the subsoil contains lenses of sand in places.

Titlth is generally good to fair, and the water-supplying capacity is moderate to high. These soils contain a moderate amount of organic matter, are low in natural fertility, and are strongly acid. They are—

Alluvial land, wet.
Chewacla silt loam.
Chewacla fine sandy loam.

About 25 percent of the acreage of these soils is cultivated, 50 percent is in woods, and 25 percent is in pasture or some other use.

If these soils are adequately drained, they can be cropped continuously. The most suitable crops are corn and tall fescue, but grain sorghum and other sorghum, soybeans, and summer vegetables are also grown. Suitable plants for pasture and hay are common bermudagrass, crimson and white clovers, and annual lespedeza. Cotton, alfalfa, wheat, barley, and bicolor lespedeza are not well suited.

These soils need liberal amounts of a complete fertilizer and of lime. Nitrogen should be added as a topdressing. To maintain and increase organic matter, leave all crop residue on the surface.

Suitable cropping system—

First year, corn interplanted with a summer legume; use shallow cultivation and lay by early; mow stubble after harvest and leave residue on the surface in winter. *Second year*, corn or grain sorghum; use shallow cultivation and lay by early; mow stubble after harvest and leave residue on the surface; drill vetch in the stubble and turn it under in spring.

Dig ditches or lay tile lines where they are needed to remove surface water or to lower the water table.

CAPABILITY UNIT IIIw-3

This capability unit consists of somewhat poorly drained, gently sloping to level soils on uplands and low stream terraces. These soils are locally called pipe-clay land. They have a very friable surface soil of silt loam and sandy loam. The subsoil ranges from friable sandy loam to firm clay and is moderately slow to slow in permeability.

The root zone is thin to moderately thick. Tilth is poor, and the water-supplying capacity is moderate. These soils are low in organic matter and are very strongly acid. They are—

Augusta slit loam, 0 to 2 percent slopes.
Augusta slit loam, 2 to 6 percent slopes.
Colfax sandy loam, 2 to 6 percent slopes.

About 10 percent of the acreage of these soils is cultivated, 50 percent is wooded, and 40 percent is in pasture or some other use.

These soils are not used for many crops. Corn, soybeans, and sorghum, including grain sorghum, are suited. Some of the most suitable plants for hay or pasture are tall fescue, annual lespedeza, common bermudagrass, ladino clover, and dallisgrass. Crops not suited are cotton, alfalfa, sericea lespedeza, Coastal bermudagrass, and small grain. These soils need liberal additions of a complete fertilizer and of lime.

Suitable cropping systems—

1. *First year,* corn or grain sorghum; use shallow cultivation and lay by early; mow stubble after harvest and leave residue on the surface during winter. *Second year through fourth year,* fescue and whiteclover seeded for hay or grazing.
2. Common bermudagrass interplanted every third year with corn or grain sorghum.

Dig ditches to remove water from the surface. Because the movement of water is moderately slow through the subsoil, lowering the water table is generally not feasible.

CAPABILITY UNIT IIIs-1

Buncombe loamy sands are the only soils in capability unit IIIs–1. These soils are deep and droughty. They are adjacent to streams on nearly level to gently sloping bottom land and are likely to be flooded occasionally. Their surface layer is very friable loamy sand, about 6 inches thick, and it is underlain by a substratum of loamy sand.

Tilth is generally good, but the water-supplying capacity is low. These soils are low in organic matter and fertility and are strongly acid.

About 45 percent of Buncombe loamy sands is cultivated, 5 percent is in trees, and 50 percent is in pasture or other use.

Large additions of a complete fertilizer and of lime are needed, and additional nitrogen should be applied as a topdressing. The sandy nature of these soils limits the range of suitable plants. Fertility and organic matter should be built up on cropland by adding fertilizer and by planting summer and winter legumes. Yields are fairly high if close-growing crops are seeded on three-fourths of the acreage each year.

Suitable cropping systems—

1. *First through third year,* sericea lespedeza. *Fourth year,* corn or grain sorghum; use shallow cultivation, lay by early, and plant sericea lespedeza during last cultivation; after harvest, mow stubble and leave residue on surface.
2. *First through third year,* Coastal bermudagrass for hay, for grazing, or for stolons that are sold. *Fourth year,* grain sorghum; use shallow cultivation and lay by early; after harvest, mow stubble and leave residue on surface all winter.

These sandy soils respond very well to additions of organic matter.

Food and cover for wildlife can be provided by planting bicolor and sericea lespedezas. Wildlife borders should be fertilized and limed every 2 or 3 years.

CAPABILITY UNIT IVe-1

Capability unit IVe–1 consists of well-drained soils in large areas on uplands and terraces. These soils are strongly acid and slightly to moderately eroded. Their surface layer—a very friable fine sandy loam or loam—is underlain by a friable to firm, clayey, reddish subsoil that transmits water freely.

Tilth is good to poor, depending on the degree of erosion. The water-supplying capacity, content of organic matter, and natural fertility are moderate to low. The soils in this unit are—

Cecil sandy loam, 10 to 15 percent slopes.
Cecil sandy loam, 10 to 15 percent slopes, eroded.
Davidson loam, thin solum, 10 to 15 percent slopes, eroded.
Habersham fine sandy loam, 10 to 15 percent slopes, eroded.
Halewood fine sandy loam, 10 to 15 percent slopes.
Hiwassee fine sandy loam, 10 to 15 percent slopes, eroded.
Lloyd loam, 10 to 15 percent slopes, eroded.
Madison fine sandy loam, 10 to 15 percent slopes.
Madison fine sandy loam, 10 to 15 percent slopes, eroded.
Masada fine sandy loam, 6 to 10 percent slopes, severely eroded.

About 15 percent of the acreage of these soils is cultivated, 60 percent is wooded, and 25 percent is in pasture or other use.

These soils are best suited to hay and pasture, but cotton, corn, and small grain can be grown. Suitable plants for hay or pasture are annual and sericea lespedezas, tall fescue, Coastal and common bermudagrasses, and crimson, white, and ladino clovers. If managed well, these soils can be cultivated occasionally. Slopes that are 100 feet or more long should be stripcropped. Keep waterways and natural draws in sod at all times. This soil should be limed, and grasses and legumes in the rotation should be fertilized liberally. Apply large amounts of a complete fertilizer and topdress with nitrogen.

If it is necessary to cultivate these soils, suitable cropping systems are—

1. *First through fifth or sixth year,* fescue for hay, grazing, or seed; plant a row crop for 1 year only if pasture is renovated.
2. *First through fourth or fifth year,* sericea lespedeza grown for hay or seed; then *for 1 year,* cotton or pimento pepper.
3. *First through fourth or fifth year,* Coastal or common bermudagrass; then *for 2 years,* corn or grain sorghum.

If they are cultivated, sloping fields should be terraced. Keep a good vegetative cover in all natural draws and in gullies. Apply fertilizer liberally when vegetation is being established or maintained. All cultivation should be on the contour. Construct a diversion channel above cultivated fields that may receive enough runoff to cause erosion. Double the normal rates of seeding and fertilizing in water-disposal areas. Irrigating fields that are planted to selected crops is practical.

Field borders will provide food and cover for wildlife if they are seeded to bicolor or sericea lespedeza. These plants need additions of fertilizer.

CAPABILITY UNIT IVe-1M

Capability unit IVe–1M consists of moderately well drained to excessively drained, strongly sloping, slightly eroded to moderately eroded soils in mountainous uplands and at the base of slopes. These soils are in large areas. The surface soil is very friable clay loam, and the subsoil is friable clay loam that transmits water freely.

Tilth ranges from good to fair, depending on the steepness of slope and the thickness of the surface layer. In most places the effective root zone is moderately thick. The water-supplying capacity is moderate. These soils have moderate to high organic-matter content and natural fertility. They are—

Porters loam, 10 to 15 percent slopes.
Tusquitee loam, 10 to 15 percent slopes.
Tusquitee loam, 10 to 15 percent slopes, eroded.

About 5 percent of the acreage in these soils is cultivated, 75 percent is wooded, and 20 percent is in pasture or some other use.

These soils are better suited to hay and pasture than to cultivated crops, but corn, small grain, and grain sorghum can be grown. Suitable plants for hay and pasture are tall fescue, annual and sericea lespedezas, Coastal and common bermudagrasses, ladino clover, vetch, and kudzu. Cotton, alfalfa, and pimento pepper are not suited. Slopes 100 feet or more long should be stripcropped. Keep vegetated waterways and natural draws in sod at all times. If it is necessary to cultivate, do not plow more than one-fifth of the acreage for row crops in a single year. These soils should be limed, and grasses and legumes in a rotation should be fertilized liberally. Apply large amounts of a complete fertilizer and topdress with nitrogen.

Suitable cropping systems—

1. *First through fourth year,* tall fescue for hay and grazing. *Fifth and sixth year,* corn or grain sorghum; use shallow cultivation and lay by early; seed vetch during last cultivation; mow and leave residue on surface all winter.
2. *First through fourth year,* sericea lespedeza for hay and grazing. *Fifth and sixth year,* corn or grain sorghum; use shallow cultivation and lay by early; mow stubble and leave residue on surface all winter.

Sloping fields should be terraced if they are cultivated. All natural draws and gullies should be kept in good vegetative cover. Use twice the normal rates of seeding and fertilizing to establish water-disposal areas. Construct a diversion channel above a cultivated field that would receive enough water to cause erosion. If water is available, irrigation of fields planted to selected crops is practical.

Field border and other areas provide good habitats for wildlife. Bicolor and sericea lespedezas are excellent plants for seeding these areas. However, these plants need adequate additions of fertilizer.

CAPABILITY UNIT IVe–2

Capability unit IVe–2 consists of well-drained, severely eroded, sloping and strongly sloping soils on uplands and stream terraces. The surface layer of these soils is sticky sandy clay loam to clay loam, and the subsoil is firm clay to clay loam.

Tilth is generally poor, but the root zone is moderately thick to thick. The water-supplying capacity is moderate to low. These soils contain a small amount of organic matter, are moderate to low in natural fertility, and are strongly acid. They are—

Cecil sandy clay loam, 6 to 10 percent slopes, severely eroded.
Hiwassee fine sandy clay loam, 6 to 10 percent slopes, severely eroded.
Hiwassee fine sandy clay loam, 10 to 15 percent slopes, severely eroded.
Lloyd clay loam, 6 to 10 percent slopes, severely eroded.
Lloyd clay loam, 10 to 15 percent slopes, severely eroded.
Madison fine sandy clay loam, 6 to 10 percent slopes, severely eroded.
Wickham clay loam, 6 to 10 percent slopes, severely eroded.

These soils are mostly in trees or are reverting to trees.

These soils are suited to only a few kinds of crops. They are fairly well suited to small grain, lespedeza, tall fescue, and grasses. They should be in sod crops most of the time because productivity is fairly low, tilth is generally poor, and erosion is difficult to control. Also, these soils can be worked within only a narrow range of moisture content, and they heave and crust. Turning under crop residue and compost helps to maintain the content of organic matter, improves tilth, and increases crop yields.

Suitable cropping system—

First year, pimento pepper or cotton; *second through fourth or fifth year,* sericea lespedeza for hay or seed.

All cultivation should be on the contour. Stripcropping will reduce surface runoff and erosion. All waterways should be in permanent sod.

Bicolor and sericea lespedezas are suitable plants for seeding field borders and areas for wildlife food and cover.

CAPABILITY UNIT IVw–1

Wehadkee silt loam is the only soil in this capability unit. This poorly drained, nearly level soil is on flood plains that are likely to be flooded frequently or for long periods. It has a silt loam surface layer of varied thickness. The subsoil is of varied texture and transmits water slowly.

Tilth is generally poor, and the effective root zone is restricted by a high water table. The water-supplying capacity is moderate to high. This soil is strongly acid, low to high in organic matter, and low in natural fertility.

Less than 1 percent of this soil is cultivated. About 80 percent is wooded, and 19 percent is in pasture or other use.

This soil is not suited to cultivated crops unless it is adequately drained and protected from overflow. Corn and sorghum can be grown in drained fields. Tall fescue, ladino clover, and dallisgrass are suitable plants for hay and pasture. This soil needs large additions of a complete fertilizer and of lime, as well as a topdressing of nitrogen.

If outlets are available, excess water can be removed by open ditches. Limited amounts of water can be removed from the subsoil by tile lines.

CAPABILITY UNIT IVw–2

Roanoke fine sandy loam is the only soil in capability unit IVw–2. This poorly drained, nearly level soil is in broad areas on low terraces that are likely to be flooded occasionally. It has a slightly plastic fine sandy loam surface soil that is underlain by a fine-textured, slowly permeable subsoil.

Tilth is generally poor, and the effective root zone is thin. The water-supplying capacity is moderate. This soil contains a small amount of organic matter, is very strongly acid, and is low in natural fertility.

Less than 1 percent of this soil is cultivated. About 35 percent is wooded, and 64 percent is in pasture or other use.

Unless it is drained, this soil is not suited to cultivated crops. Drained fields are moderately well suited to corn, grain sorghum, and soybeans. Tall fescue mixed with ladino clover is suitable for hay and pasture. The wooded areas of this soil, however, should be kept in woods. This soil needs large additions of a complete fertilizer and of lime. Nitrogen should be added as a top dressing for pasture or as a side dressing for row crops. If a good soil structure is maintained and the soil is kept porous, drainage is improved.

Suitable cropping system—

First through third year, tall fescue for hay and grazing. *Fourth and fifth year,* sorghum and soybeans for hay.

Open ditches will help to remove excess water from this soil.

CAPABILITY UNIT VIe-1

Capability unit VIe–1 consists of sloping to moderately steep, stony, thin soils that are generally well drained. These soils are on uplands and are slightly to severely eroded. Their surface soil is friable to firm stony clay loam or stony loam. The subsoil is thin, firm to friable clay loam that transmits water moderately slowly.

Tilth is generally poor, and the water-supplying capacity is low. These soils are strongly acid. They are—

Clifton-Davidson stony complex, 15 to 25 percent slopes.
Musella stony clay loam, 10 to 15 percent slopes, severely eroded.
Musella stony clay loam, 15 to 25 percent slopes, eroded.
Tusquitee stony loam, 6 to 10 percent slopes.
Tusquitee stony loam, 10 to 15 percent slopes.

Less than 1 percent of the acreage of these soils is cultivated. About 85 percent is in woods, and 15 percent is in pasture or other use.

Because they are thin, steep, stony, and subject to severe erosion, these soils are not suited to row crops. If open areas are liberally fertilized and limed, they will produce a small amount of hay and pasture. However, land preparation, seeding, and mowing will probably be difficult. Suitable pasture plants are common bermudagrass, white clover, annual lespedeza, tall fescue, ladino clover, and sericea lespedeza. Grazing should be controlled.

These soils are well suited to shortleaf, Virginia, white, and loblolly pines. Suitable hardwoods are red, chestnut, post, white, and black oaks, and hickory. Poplar grows along drains and on lower slopes. The woodland should be protected from fire and grazing, and improved gradually by selective cutting.

Fence rows and short corners provide food and cover for wildlife if they are seeded to bicolor and common lespedezas. These areas need large additions of a complete fertilizer if they are to produce continuous food and cover for wildlife.

CAPABILITY UNIT VIe-2

Capability unit VIe–2 consists of well-drained to somewhat poorly drained, sloping to moderately steep soils on uplands and terraces. Erosion ranges from slight to severe. The surface layer of these soils is friable fine sandy loam in the less eroded areas. In the severely eroded areas the surface layer is fine sandy clay loam and clay loam.

The less eroded soils are generally in good tilth and have a good water-supplying capacity. The severely eroded soils are in poor tilth and have a moderate water-supplying capacity. The subsoil is firm to friable clay loam and sandy clay loam to clay. It is permeable to water. The content of organic matter is moderate to low, and natural fertility is low. These soils are strongly acid. They are—

Cecil sandy loam, 15 to 25 percent slopes.
Cecil sandy loam, 15 to 25 percent slopes, eroded.
Cecil sandy clay loam, 10 to 15 percent slopes, severely eroded.
Clifton-Davidson complex, 15 to 25 percent slopes.
Colfax sandy loam, 6 to 10 percent slopes, eroded.
Davidson loam, thin solum, 15 to 25 percent slopes.
Halewood fine sandy loam, 15 to 25 percent slopes.
Madison fine sandy loam, 15 to 25 percent slopes.
Madison fine sandy loam, 15 to 25 percent slopes, eroded.
Madison fine sandy clay loam, 6 to 10 percent slopes, very severely eroded.
Madison fine sandy clay loam, 10 to 15 percent slopes, severely eroded.
Porters loam, 15 to 25 percent slopes.
Watauga loam, 15 to 25 percent slopes.

Less than 5 percent of the acreage of these soils is cultivated, 85 percent is wooded, and 10 percent is in pasture or other use.

The Colfax soil is the only soil in this capability unit that is somewhat poorly drained. The rest of the soils are well drained.

Because they are steep or are susceptible to severe erosion, the soils in this unit are not suited to cultivated crops. A limited amount of hay and pasture can be grown if these soils are well fertilized and limed and if the meadow is maintained by mowing and other practices. Suitable plants for hay or pasture are Coastal bermudagrass, ladino clover, tall fescue, sericea lespedeza, and kudzu.

These soils are well suited to loblolly, shortleaf, Virginia, and white pines. Suitable hardwoods are red, chestnut, white, black, and post oaks and hickory. Poplar and maple commonly grow near the base of slopes and along drainageways.

Fence rows and odd corners provide food and cover for wildlife if these places are seeded to bicolor and sericea lespedezas. Small open areas in woods may be seeded to bicolor lespedeza or, for deer and turkey, to tall fescue and whiteclover.

CAPABILITY UNIT VIe-3

Louisburg sandy loam, 10 to 15 percent slopes, eroded, is the only soil in this capability unit. This soil is well drained to somewhat excessively drained and is shallow over bedrock. It is scattered in small areas on uplands. The surface soil is friable sandy loam that is commonly underlain by bedrock or a stony layer at depths of 6 to 30 inches.

Tilth is generally fair, but the water-supplying capacity is low. The content of organic matter is low, natural fertility is very low to low, and the reaction is strongly acid.

About 3 percent of this soil is cultivated, 65 percent is wooded, and 32 percent is in pasture or other use.

Although this soil is suited to hay and pasture, the clearing of wooded areas may not be practical. Suitable plants for hay or pasture are kudzu, sericea lespedeza, tall fescue, ladino clover, and white clover. Kudzu and sericea lespedeza may be grown alone or may be grown with reseeding legumes and grasses. The meadow must be adequately limed and fertilized, and mowing and repeated application of fertilizer or manure are needed for maintenance.

This soil is suited to Virginia and shortleaf pines. Protect the woodland from fire and grazing, and practice selective cutting.

Field borders and other areas provide food and cover for wildlife if these places are seeded to bicolor and sericea lespedezas. These wildlife areas need additions of fertilizer.

CAPABILITY UNIT VIIe-1

This capability unit consists generally of well-drained, strongly sloping to very steep soils on uplands and in mountains. Erosion ranges from slight to severe. The surface layer of most of these soils is friable sandy loam

or fine sandy loam that has a moderate moisture-supplying capacity. The severely eroded, strongly sloping soils have a surface soil of friable to firm fine sandy clay loam that is low in moisture-supplying capacity. The subsoil of the soils in this unit is firm to friable clay, sandy clay loam, or loam.

These soils contain a moderate to low amount of organic matter, are low in natural fertility, and are strongly acid. They are—

Cecil sandy clay loam, 15 to 25 percent slopes, severely eroded.
Cecil sandy loam, thin solum, 25 to 60 percent slopes.
Clifton-Davidson complex, 25 to 60 percent slopes.
Davidson loam, thin solum, 25 to 60 percent slopes.
Halewood fine sandy loam, 25 to 60 percent slopes.
Madison fine sandy clay loam, 10 to 15 percent slopes, very severely eroded.
Madison fine sandy clay loam, 15 to 25 percent slopes, severely eroded.
Madison fine sandy clay loam, 15 to 25 percent slopes, very severely eroded.
Madison fine sandy loam, 25 to 60 percent slopes.
Porters loam, 25 to 60 percent slopes.
Porters loam, 60 to 80 percent slopes.
Watauga loam, 25 to 60 percent slopes.

Less than 1 percent of the acreage of these soils is cultivated, 90 percent is wooded, and about 9 percent is in pasture or other use.

Because they are very steep and are susceptible to severe erosion, these soils are not suited to row crops. The less eroded areas may be used to some extent for hay and pasture if large amounts of a complete fertilizer and of lime are added. It is difficult to prepare seedbeds, to apply fertilizer, and to carry out other practices that are needed for sustained production. Suitable pasture plants are tall fescue, ladino clover, sericea lespedeza, Coastal bermudagrass, and kudzu.

These soils are well suited to shortleaf, loblolly, white, and Virginia pines. Suitable hardwoods are red, chestnut, post, black, and white oaks and hickory. Poplar and maple commonly grow near the foot of slopes and along drainageways. Protect wooded areas from fire and grazing, and practice selective cutting.

Strips in open areas or in woods may be planted to bicolor lespedeza to attract quail. Other areas may be planted to tall fescue and ladino clover to attract deer and turkey. Large applications of a complete fertilizer are necessary to establish and maintain these areas for sustained production of food and cover for wildlife.

CAPABILITY UNIT VIIe–2

Capability unit VIIe–2 consists of well-drained to excessively drained, strongly sloping to very steep soils on uplands and in mountains. These soils are shallow to moderately shallow and are slightly eroded to severely eroded. The surface soil is loam, fine sandy loam, and sandy loam and is low to moderate in water-supplying capacity. The subsoil is thin and, in many places, consists of discontinuous loam and clay loam with rapid to moderate permeability.

These soils contain a low to moderate amount of organic matter, are low in natural fertility, and are strongly acid. They are—

Chandler loam, 15 to 25 percent slopes.
Chandler loam, 25 to 60 percent slopes.
Chandler loam, 60 to 95 percent slopes.
Clifton-Davidson stony complex, 25 to 60 percent slopes.
Clifton-Davidson stony complex, 60 to 90 percent slopes.
Louisa fine sandy loam, 15 to 25 percent slopes.
Louisa fine sandy loam, 25 to 60 percent slopes.
Louisa fine sandy loam, 60 to 90 percent slopes.
Louisa fine sandy clay loam, 15 to 25 percent slopes, severely eroded.
Louisburg sandy loam, 15 to 25 percent slopes.
Porters-Ashe stony loams, 25 to 60 percent slopes.
Porters-Ashe stony loams, 60 to 95 percent slopes.

Less than 1 percent of the acreage of these soils is cultivated. About 95 percent is wooded, and about 5 percent is in pasture or other use.

These soils are too shallow, steep, and droughty to be used for cultivated crops, hay, or pasture. They are well suited to shortleaf, loblolly, Virginia, and white pines. Suitable hardwoods are hickory, black locust, and chestnut, red, black, post, and white oaks. Poplar, maple, and gum grow along drainageways and near the toe of slopes. Protect the woodland, particularly new plantings, from fire and grazing, and practice selective cutting.

Strips in open areas or in woods may be planted to bicolor lespedeza to attract quail. Other areas may be planted to tall fescue and ladino clover to attract deer and turkey. Large additions of a complete fertilizer are needed to establish these areas and to keep them productive of food and cover for wildlife.

CAPABILITY UNIT VIIs–1

This unit consists of well-drained to somewhat excessively drained, stony, strongly sloping to steep soils that are permeable and have a thin root zone. These soils have varied characteristics. The natural fertility and content of organic matter are low. The soils of this unit are—

Cecil stony sandy loam, 15 to 25 percent slopes.
Cecil stony sandy loam, thin solum, 25 to 60 percent slopes.
Louisburg-Habersham stony fine sandy loams, 10 to 15 percent slopes.
Louisburg-Habersham stony fine sandy loams, 10 to 15 percent slopes, severely eroded.
Louisburg-Habersham stony fine sandy loams, 15 to 25 percent slopes.
Louisburg-Habersham stony fine sandy loams, 25 to 60 percent slopes.
Porters-Ashe stony loams, 15 to 25 percent slopes.

These soils are too stony, too shallow, and too steep for cultivated crops, hay, or pasture. They are best suited to trees and as wildlife habitats. Shortleaf, Virginia, loblolly, and white pines yield fairly well on these soils.

Estimated Yields

Table 2 lists estimated average acre yields of principal crops. These estimates are listed for the soils of the county under two levels of management. The yields in columns A are those expected when practices are followed similar to those used by most of the successful farmers in the county. The yields in columns B are expected when superior practices are followed.

In estimating yields, the capability of the soils and their suitability for certain crops were considered. Estimates were made only for those soils that were well enough suited to the crops to give profitable yields, and only for soils that would not be damaged by erosion if good practices of soil conservation were used.

Fertilizer is applied for cotton and corn as a part of common management, or management that is expected to result in the yields in columns A. This fertilizer is

TABLE 2.—*Estimated average acre yields of*

[Yields in columns A are to be expected under common management; yields in columns B, under improved

Soil name	Cotton		Corn		Grain sorghum		Wheat	
	A	B	A	B	A	B	A	B
	Lb.	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
Alluvial land			30	75	40	60		
Alluvial land, wet								
Altavista fine sandy loam, 0 to 2 percent slopes	250	400	30	80	25	60		
Altavista fine sandy loam, 2 to 6 percent slopes	350	500	25	75	25	50		
Altavista fine sandy loam, 2 to 6 percent slopes, eroded	300	450	20	60	25	45		
Appling sandy loam, 2 to 6 percent slopes, eroded	300	400	15	40	25	35	10	20
Appling sandy loam, 6 to 10 percent slopes, eroded	200	300	12	35	25	35	10	20
Augusta silt loam, 0 to 2 percent slopes			15	20	20	30	10	15
Augusta silt loam, 2 to 6 percent slopes			15	40	25	35	10	20
Buncombe loamy sands			12	50	20	45		
Cecil sandy clay loam, 6 to 10 percent slopes, severely eroded								
Cecil sandy clay loam, 10 to 15 percent slopes, severely eroded								
Cecil sandy clay loam, 15 to 25 percent slopes, severely eroded								
Cecil sandy loam, 2 to 6 percent slopes, eroded	325	500	25	60	30	55	12	12
Cecil sandy loam, 6 to 10 percent slopes	325	450	25	60	25	50	15	20
Cecil sandy loam, 6 to 10 percent slopes, eroded	275	400	20	50	25	45	12	18
Cecil sandy loam, 10 to 15 percent slopes			25	50	30	50	12	20
Cecil sandy loam, 10 to 15 percent slopes, eroded			20	40	25	45	10	20
Cecil sandy loam, 15 to 25 percent slopes								
Cecil sandy loam, 15 to 25 percent slopes, eroded								
Cecil sandy loam, thin solum, 25 to 60 percent slopes								
Cecil stony sandy loam, 15 to 25 percent slopes								
Cecil stony sandy loam, thin solum, 25 to 60 percent slopes								
Chandler loam, 15 to 25 percent slopes								
Chandler loam, 25 to 60 percent slopes								
Chandler loam, 60 to 95 percent slopes								
Chewacla silt loam			35	75	40	60		
Chewacla fine sandy loam			30	75	40	60		
Clifton-Davidson complex, 15 to 25 percent slopes								
Clifton-Davidson complex, 25 to 60 percent slopes								
Clifton-Davidson stony complex, 15 to 25 percent slopes								
Clifton-Davidson stony complex, 25 to 60 percent slopes								
Clifton-Davidson stony complex, 60 to 90 percent slopes								
Colfax sandy loam, 2 to 6 percent slopes			10	30	20	30		
Colfax sandy loam, 6 to 10 percent slopes, eroded			8	30	20	30		
Congaree silt loam			35	100	40	60		
Congaree soils, local alluvium			35	100	40	60		
Davidson loam, thin solum, 10 to 15 percent slopes, eroded								
Davidson loam, thin solum, 15 to 25 percent slopes								
Davidson loam, thin solum, 25 to 60 percent slopes								
Habersham fine sandy loam, 2 to 6 percent slopes, eroded	250	400	12	40	25	35	10	20
Habersham fine sandy loam, 6 to 10 percent slopes	250	400	12	40	25	35	10	20
Habersham fine sandy loam, 6 to 10 percent slopes, eroded	200	350	10	35	25	35	10	20
Habersham fine sandy loam, 10 to 15 percent slopes, eroded			8	30	25	35	10	20
Halewood fine sandy loam, 2 to 6 percent slopes, eroded	300	400	15	40	25	35	10	20
Halewood fine sandy loam, 6 to 10 percent slopes	200	300	12	35	25	35	10	20
Halewood fine sandy loam, 6 to 10 percent slopes, eroded	200	300	12	35	25	35	10	20
Halewood fine sandy loam, 10 to 15 percent slopes					25	35		
Halewood fine sandy loam, 15 to 25 percent slopes								
Halewood fine sandy loam, 25 to 60 percent slopes								
Hiwassee fine sandy clay loam, 6 to 10 percent slopes, severely eroded								
Hiwassee fine sandy clay loam, 10 to 15 percent slopes, severely eroded								
Hiwassee fine sandy loam, 2 to 6 percent slopes, eroded	325	500	30	80	35	65	16	22
Hiwassee fine sandy loam, 6 to 10 percent slopes, eroded	300	500	30	75	35	60	15	20
Hiwassee fine sandy loam, 10 to 15 percent slopes, eroded								
Lloyd loam, 2 to 6 percent slopes, eroded	375	525	25	60	30	55	15	23
Lloyd loam, 6 to 10 percent slopes	350	500	25	50	30	50	15	25
Lloyd loam, 6 to 10 percent slopes, eroded	300	450	25	55	30	55	15	23
Lloyd loam, 10 to 15 percent slopes, eroded								
Lloyd clay loam, 6 to 10 percent slopes, severely eroded	225	375	12	35	25	40	8	15
Lloyd clay loam, 10 to 15 percent slopes, severely eroded								

See footnote at end of table.

principal crops under two levels of management

management. Dashed lines indicate that the soil is not commonly used for the crop specified or is not suited to it]

Oats		Coastal bermudagrass pasture		Coastal bermudagrass hay		Pasture		Alfalfa		Lespedeza	
A	B	A	B	A	B	A	B	A	B	A	B
Bu.	*Bu.*	*Cow-acre-days*[1]	*Cow-acre-days*[1]	*Tons*	*Tons*	*Cow-acre-days*[1]	*Cow-acre-days*[1]	*Tons*	*Tons*	*Tons*	*Tons*
35	90	90	170	3.0	6.0	75	210			1.5	1.8
						60	120			.5	.7
35	70	70	150	2.5	5.0	65	190			1.3	1.6
35	70	70	150	2.5	5.0	65	185			1.2	1.5
30	65	60	145	2.0	4.5	60	175			1.2	1.4
30	65	60	145	2.0	4.5	60	175		2.5	.8	1.0
30	65	60	145	2.0	4.5	60	175		2.5	.8	1.0
30	60	60	75	2.1	5.1	60	220			.5	.7
30	65	70	185	2.3	6.2	70	225			.5	.7
		50	125	1.7	4.1	25	50			.7	.9
		40	130	1.3	4.3	45	170			.6	.8
		40	130	1.3	4.3	45	170			.6	.8
		35	125	1.2	4.2	35	160			.5	.7
40	75	70	160	2.3	5.3	70	200		2.5	1.4	1.6
40	75	65	160	2.2	5.3	65	195		2.0	1.2	1.5
35	70	60	150	2.0	5.0	60	190		2.0	1.0	1.3
35	65	65	160	2.2	5.3	65	195		1.6	1.2	1.4
30	60	60	150	2.0	5.0	60	180		1.4	1.1	1.3
		40	125	1.3	4.2	40	160			.7	.8
		30	100	1.0	3.7	30	140			.6	.8
		75	180	2.5	6.0	75	225			1.5	1.8
		75	180	2.5	6.0	75	225			1.5	1.8
		40	125	1.3	4.2	40	160			.7	.8
		35	125	1.8	4.0	40	160			.8	.8
25	60	50	130	1.8	4.1	50	150			.6	.8
25	50	40	110	1.6	3.8	45	140			.5	.7
35	70	80	190	2.7	6.3	85	260			1.7	2.0
35	70	80	190	2.7	6.0	85	250			1.7	2.0
		40	135	1.8	4.0	40	175			.9	.9
		35	125	1.8	4.0	40	170			.8	.8
30	65	60	145	2.0	4.0	30	70			.8	1.0
30	65	60	145	2.0	4.0	30	70			.8	1.0
30	65	60	145	2.0	4.0	30	70			.8	1.0
30	60	60	145	2.0	4.0	30	70				
30	65	60	145	2.0	4.5	60	175		2.5	.8	1.0
30	65	60	145	2.0	4.5	60	175		2.5	.8	1.0
30	65	60	145	2.0	4.5	60	175		2.5	.8	1.0
30	60	60	140	2.0	4.4	60	170			.7	.8
		50	130	1.8	4.0	55	160			.6	.7
		60	170	2.0	5.9	60	210			1.3	1.6
		60	165	2.0	5.5	60	200			1.2	1.5
40	75	35	195	2.9	6.5	85	230		3.5	1.6	1.8
35	70	80	190	2.7	6.3	80	225		3.5	1.5	1.8
		70	175	2.4	5.9	70	210			1.4	1.6
40	80	70	180	2.3	6.0	70	220		3.5	1.2	1.6
40	80	70	180	2.3	6.0	70	220		3.5	1.2	1.6
35	70	70	175	2.3	5.8	70	210		3.0	1.2	1.5
		70	170	2.3	5.8	65	200		3.0	1.2	1.4
20	40	40	135	1.3	4.5	45	175			1.0	1.2
		35	120	1.2	4.0	35	160			.7	.8

TABLE 2.—*Estimated average acre yields of principal*

Soil name	Cotton		Corn		Grain sorghum		Wheat	
	A	B	A	B	A	B	A	B
	Lb.	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
Louisa fine sandy clay loam, 15 to 25 percent slopes, severely eroded								
Louisa fine sandy loam, 15 to 25 percent slopes								
Louisa fine sandy loam, 25 to 60 percent slopes								
Louisa fine sandy loam, 60 to 90 percent slopes								
Louisburg sandy loam, 10 to 15 percent slopes, eroded								
Louisburg sandy loam, 15 to 25 percent slopes								
Louisburg-Habersham stony fine sandy loams, 10 to 15 percent slopes								
Louisburg-Habersham stony fine sandy loams, 10 to 15 percent slopes, severely eroded								
Louisburg-Habersham stony fine sandy loams, 15 to 25 percent slopes								
Louisburg-Habersham stony fine sandy loams, 25 to 60 percent slopes								
Madison fine sandy clay loam, 2 to 6 percent slopes, severely eroded	250	325	10	45	20	40	8	15
Madison fine sandy clay loam, 6 to 10 percent slopes, severely eroded								
Madison fine sandy clay loam, 6 to 10 percent slopes, very severely eroded								
Madison fine sandy clay loam, 10 to 15 percent slopes, severely eroded								
Madison fine sandy clay loam, 10 to 15 percent slopes, very severely eroded								
Madison fine sandy clay loam, 15 to 25 percent slopes, severely eroded								
Madison fine sandy clay loam, 15 to 25 percent slopes, very severely eroded								
Madison fine sandy loam, 2 to 6 percent slopes, eroded	350	500	25	60	25	45	10	20
Madison fine sandy loam, 6 to 10 percent slopes	320	475	20	55	25	45	10	20
Madison fine sandy loam, 6 to 10 percent slopes, eroded	325	450	20	50	25	45	10	20
Madison fine sandy loam, 10 to 15 percent slopes								
Madison fine sandy loam, 10 to 15 percent slopes, eroded								
Madison fine sandy loam, 15 to 25 percent slopes								
Madison fine sandy loam, 15 to 25 percent slopes, eroded								
Madison fine sandy loam, 25 to 60 percent slopes								
Masada fine sandy loam, 2 to 6 percent slopes, eroded	300	450	20	50	25	35	10	20
Masada fine sandy loam, 6 to 10 percent slopes, eroded	250	400	15	45	20	35	10	20
Masada fine sandy loam, 6 to 10 percent slopes, severely eroded								
Musella stony clay loam, 10 to 15 percent slopes, severely eroded								
Musella stony clay loam, 15 to 25 percent slopes, eroded								
Porters loam, 10 to 15 percent slopes								
Porters loam, 15 to 25 percent slopes								
Porters loam, 25 to 60 percent slopes								
Porters loam, 60 to 80 percent slopes								
Porters-Ashe stony loams, 15 to 25 percent slopes								
Porters-Ashe stony loams, 25 to 60 percent slopes								
Porters-Ashe stony loams, 60 to 95 percent slopes								
Roanoke fine sandy loam								
Tusquitee loam, 2 to 6 percent slopes			30	75	25	35	10	20
Tusquitee loam, 6 to 10 percent slopes			25	60	25	35	10	20
Tusquitee loam, 6 to 10 percent slopes, eroded			20	55	25	35	10	20
Tusquitee loam, 10 to 15 percent slopes			20	50	20	30	10	20
Tusquitee loam, 10 to 15 percent slopes, eroded			20	50	20	30	10	20
Tusquitee stony loam, 6 to 10 percent slopes								
Tusquitee stony loam, 10 to 15 percent slopes								
Watauga loam, 15 to 25 percent slopes								
Watauga loam, 25 to 60 percent slopes								
Wehadkee silt loam								
Wickham fine sandy loam, 2 to 6 percent slopes, eroded	325	550	30	65	30	55	10	20
Wickham fine sandy loam, 6 to 10 percent slopes, eroded	275	400	20	50	25	45	12	18
Wickham clay loam, 6 to 10 percent slopes, severely eroded								

[1] Number of days that one animal unit can be supported on an acre without injury to the pasture. An animal unit is a cow or steer, 5 hogs, or 7 sheep.

crops under two levels of management—Continued

Oats		Coastal bermudagrass pasture		Coastal bermudagrass hay		Pasture		Alfalfa		Lespedeza	
A	B	A	B	A	B	A	B	A	B	A	B
Bu.	*Bu.*	*Cow-acre-days*[1]	*Cow-acre-days*[1]	*Tons*	*Tons*	*Cow-acre-days*[1]	*Cow-acre-days*[1]	*Tons*	*Tons*	*Tons*	*Tons*
		15	80	0. 4	2. 5	20	100			0. 3	0. 5
		25	100	. 8	3. 3	35	100			. 4	. 6
		20	90	. 7	3. 1	30	90			. 4	. 6
		40	110	1. 3	3. 7	40	90			. 5	. 9
						30	75			. 3	. 5
20	40	55	140	1. 5	4. 0	55	185		1. 5	1. 5	1. 8
		40	130	1. 3	4. 0	40	170			1. 0	1. 3
		35	125	1. 2	4. 2	35	160			. 7	. 8
		40	130	1. 3	4. 3	40	170			1. 0	1. 3
		30	100	1. 0	4. 0	30	150			. 6	. 8
		35	125	1. 2	4. 2	35	160			. 7	. 8
		25	100	. 8							
40	75	70	160	2. 3	5. 3	70	200		2. 5	1. 4	1. 7
40	75	65	155	2. 3	5. 3	65	200		2. 2	1. 2	1. 6
40	75	60	150	2. 3	5. 0	60	190		2. 0	1. 1	1. 4
		50	140	2. 3	4. 5	50	180			. 8	1. 0
		40	135	2. 3	4. 5	40	175			. 7	. 9
		40	130	2. 3	4. 3	40	165			. 6	. 9
		40	125	2. 3	4. 2	40	160			. 5	. 8
30	65	60	145	2. 0	4. 8	60	180		1. 5	1. 1	1. 3
25	60	50	140	1. 8	4. 6	50	170		1. 2	1. 0	1. 3
		40	130	1. 3	4. 0	40	170			. 9	1. 1
		30	110	1. 0	3. 8	30	150			. 6	. 7
		30	120	1. 1	4. 0	30	150			. 7	. 8
		45	135	1. 5	4. 5	45	165			1. 0	1. 3
		40	125	1. 3	4. 2	40	160			. 7	. 8
		30	100	. 8	3. 6	30	150			. 4	. 6
						40	120				
30	65	60	145	2. 0	4. 5	60	175		2. 5	. 8	1. 0
30	65	60	145	2. 0	4. 5	60	175		2. 5	. 8	1. 0
30	65	60	145	2. 0	4. 5	60	175		2. 5	. 8	1. 0
25	60	55	135	1. 8	4. 3	55	165		2. 0	. 7	. 8
25	60	55	135	1. 8	4. 3	55	165		2. 0	. 7	. 8
		50	130	1. 8	4. 0	55	160			. 6	. 7
						40	120				
40	75	70	175	2. 3	5. 8	70	210		2. 5	1. 4	1. 6
35	70	60	150	2. 0	5. 0	60	150		2. 0	1. 0	1. 3
		40	130	1. 3	4. 3	45	170			. 6	. 8

applied at the rate per acre of 15 to 25 pounds of nitrogen and 30 to 50 pounds of phosphate (P_2O_5) and of potash (K_2O). In addition, most farmers also apply 20 to 40 pounds of nitrogen as a side dressing. Green-manure crops are seldom used.

The most successful farmers increase this rate of fertilization and obtain the yields listed in columns B. These farmers apply 500 to 800 pounds of a complete fertilizer at planting, and later apply a side dressing of 50 to 125 pounds of nitrogen. Suitable crop rotations are used, but green-manure crops are not planted frequently.

The estimates of pasture yield in columns A are for permanent pasture that receives practically no management. The estimates in columns B are for permanent pasture of suitable grass-and-clover mixtures that are limed and fertilized at planting time and that are top-dressed when needed. These estimates are in cow-acre-days. Cow-acre-days are the number of days that one animal unit can be supported on an acre without injury to the pasture. It is the product of the number of animal units on an acre multiplied by the number of days of grazing. For example, a soil that can support two animal units for 140 days is rated 2 times 140, or 280, cow-acre-days. An animal unit is a cow or steer, 5 hogs, or 7 sheep.

The yield data in table 2 are based on information obtained from many farmers, from the county agent and other agricultural leaders, and from observations made by members of the survey party.

Woodland[2]

Woodland makes up about 78 percent of Habersham County. According to the United States Census of Agriculture, 56,542 acres is woodland on farms. The rest is privately owned timberland and timberland in the Chattahoochee National Forest. Commercial forests occupy more than 128,000 acres (*5*).[3]

In 1956, pulp and paper companies acquired 9,878 cords (128 cu. ft. per cord) of rough wood in Habersham County. This wood was valued at more than $156,000 (*4*). The woodyard nearest to Habersham County is at Toccoa in Stephens County; two more are at Gainesville in Hall County.

Kinds of Woodland

Stands of shortleaf pine and Virginia pine, mixed in many places with upland hardwoods, make up about 60 percent of the woodland. White pine is in scattered areas high in the mountains. Small areas of loblolly pine are in the southern part of the county. Upland hardwoods occur locally, and bottom-land hardwoods are extensive along the main streams and local creeks. The principal forest types in the area are shortleaf pine, Virginia pine, and mixed pine and hardwood. The mixed stands contain Virginia pine, shortleaf pine, and various hardwoods, mostly oak and gum.

[2] This section was written by LUITPOLD W. KEMPF, woodland conservationist, SCS, and S. M. ROBERTSON, soil scientist, SCS.

[3] Italic numbers in parentheses refer to Literature Cited, page 83.

Woodland Suitability Groups

To assist in planning the use of soils for growing trees, the soils in Habersham County have been placed in 17 woodland suitability groups. The soils in each group have about the same moisture-supplying capacity and, therefore, have about the same potential productivity. They are subject to similar hazards and limitations and require similar management.

For each group, table 3 lists in feet the expected height of the dominant and codominant trees at the age of 50 years. This measure is the site index. Table 3 also lists ratings for seedling mortality, plant competition, equipment limitations, and erosion hazard.

Seedling mortality is the failure of seedlings to grow in a soil after natural seeding or after seedlings have been planted. It is affected by the nature of the soil and by other environmental factors. The ratings of seedling mortality given in this report are for trees in a normal environment. Mortality is *slight* if not more than 25 percent of the planted seedlings die, or if trees ordinarily regenerate naturally in places where there are enough seeds. It is *moderate* if 25 to 50 percent of the planted seedlings die, or if trees do not regenerate naturally in numbers needed for adequate restocking. In some places, replanting to fill open spaces will be necessary. Mortality is *severe* if more than 50 percent of the planted seedlings die, or if trees do not ordinarily reseed naturally in places where there are enough seeds. If mortality is severe, plant seedlings where the seeds do not grow, prepare special seedbeds, and use good methods of planting to assure a full stand of trees.

Plant competition is rated according to the degree that undesirable plants invade the woodlots. Competition is *slight* if unwanted plants do not cause a special problem. It is *moderate* if the invaders delay but do not prevent the establishment of a normal, fully stocked stand. If plant competition is moderate, seedbed preparation is generally not needed and simple methods can be used to prevent undersirable plants from invading. Competition is *severe* if trees cannot regenerate naturally. Where competition is severe, carefully prepare the site and use management that includes controlled burning, spraying with chemicals, and girdling.

Equipment limitations are rated according to the degree that soils restrict or prevent the use of forestry equipment. Limitations are *slight* if there are no restrictions on the type of equipment or on the time of year that equipment can be used. They are *moderate* if slopes are moderately steep, if heavy equipment is restricted by wetness in winter and early in spring, or if the use of equipment damages the tree roots to some extent. Equipment limitations are *severe* if many types of equipment cannot be used, if the time equipment cannot be used is more than 3 months a year, and if the use of equipment severely damages the roots of trees and the structure and stability of the soil. Equipment limitations are severe on moderately steep and steep soils that are stony and have rock outcrops. They are also severe on wet bottom lands and low terraces in winter or early in spring.

Erosion hazard is rated according to the risk of erosion on well-managed woodland that is not protected by special practices. It is *slight* where only a slight loss of soil is

expected. Generally, erosion is only slight if slopes range from 0 to 2 percent and runoff is slow or very slow. The erosion hazard is *moderate* where there would be a moderate loss of soil if runoff is not controlled and the vegetative cover is not adequate for protection. It is *severe* where steep slopes, rapid runoff, slow infiltration and permeability, and past erosion make the soil susceptible to severe erosion.

WOODLAND SUITABILITY GROUP 1

This group consists of deep to moderately deep, well drained and moderately well drained soils on bottom lands. These soils have a silt loam to sandy loam surface layer over mixed material. Slopes range from 0 to 6 percent. The soils in this group cover about 1.8 percent of the county. They are:

Alluvial land.
Congaree silt loam.
Congaree soils, local alluvium.

The average site index is 82 for shortleaf pine and Virginia pine, 95 for loblolly pine, and 105 for white pine. Yellow-poplar grows rapidly on the soils in this group.

Seedling mortality is slight, but plant competition is severe. Because adequate stands of desired trees do not regenerate naturally, special preparation of sites is needed. Spraying, girdling, and other steps are necessary to prevent hardwoods, shrubs, and weeds from overshading the planted seedlings.

Equipment limitations are slight. Except during and immediately after heavy rains, ordinary woodland equipment and machinery generally can be used. Occasionally, however, flooding may endanger machinery. Heavy machinery can be used about two-thirds of the time.

The hazard of erosion is slight, and there may be some overwash or scour.

WOODLAND SUITABILITY GROUP 2

This group consists of moderately deep to shallow, somewhat poorly drained soils on bottom lands and low stream terraces. The surface layer of these soils is silt loam or fine sandy loam over mixed material. Slopes range from 0 to 6 percent. The soils in this group cover about 4.6 percent of the county. They are:

Alluvial land, wet.
Augusta silt loam, 0 to 2 percent slopes.
Augusta silt loam, 2 to 6 percent slopes.
Chewacla silt loam.
Chewacla fine sandy loam.

The average site index is 79 for shortleaf pine and Virginia pine, 95 for loblolly pine, and 105 for white pine. Yellow-poplar grows rapidly on soils of this group.

Seedling mortality is slight, but plant competition is severe. Adequate stands of desired trees do not regenerate naturally. Planting sites should be prepared specially. Spraying, girdling, and other practices are necessary to prevent hardwoods, shrubs, and weeds from overshading the planted seedlings. Flooding may occasionally endanger machinery.

Equipment limitations are moderate because the soils are wet. Heavily loaded equipment sinks into the soil in wet weather and can be used for only about one-third to one-half of the time. Heavy machinery can be used about one-third of the time.

The erosion hazard is only slight, but the soils are likely to be flooded frequently.

WOODLAND SUITABILITY GROUP 3

This group consists of gently sloping to strongly sloping, deep to moderately deep soils that are well drained. These soils are on uplands and stream terraces and are very severely eroded. The surface layer is fine sandy clay loam to fine sandy loam and is underlain by red clay loam to clay. The soils in this group cover about 9.7 percent of the county. They are:

Cecil sandy clay loam, 6 to 10 percent slopes, severely eroded.
Cecil sandy clay loam, 10 to 15 percent slopes, severely eroded.
Hiwassee fine sandy clay loam, 6 to 10 percent slopes, severely eroded.
Hiwassee fine sandy clay loam, 10 to 15 percent slopes, severely eroded.
Madison fine sandy clay loam, 2 to 6 percent slopes, severely eroded.
Madison fine sandy clay loam, 6 to 10 percent slopes, severely eroded.
Madison fine sandy clay loam, 10 to 15 percent slopes, severely eroded.
Masada fine sandy loam, 6 to 10 percent slopes, severely eroded.
Wickham clay loam, 6 to 10 percent slopes, severely eroded.

The average site index is 68 for shortleaf pine and Virginia pine, 84 for loblolly pine, and 98 for white pine.

Seedling mortality is moderate (fig. 4). Because adequate stands of desired seedlings occasionally do not grow, replanting is sometimes necessary. Planted trees generally grow faster and in more even stands than do trees that regenerate naturally (fig. 5).

Plant competition and equipment limitations are slight. Ordinary woodland equipment and machinery may be used except during and immediately after heavy rains.

The erosion hazard is slight to moderate. Locate roads, skidtrails, and landings carefully so that erosion is not accelerated.

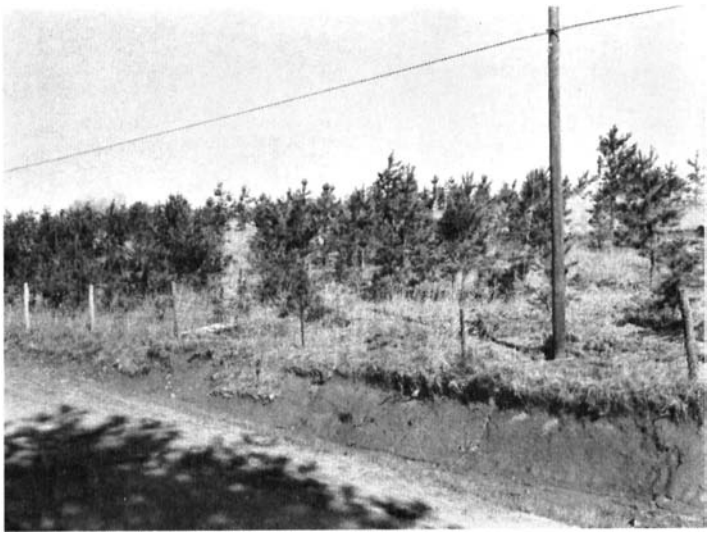

***Figure 4.*—Virginia pine and shortleaf pine that have regenerated naturally on Madison fine sandy clay loam, 10 to 15 percent slopes, severely eroded. This soil produces moderate yields of pine. Planting generally gives a more uniform, faster growing stand than does natural regeneration. Woodland suitability group 3.**

TABLE 3.—*Woodland suitability grouping of soils*

[Refer to text for a discussion of each woodland suitability group and for a list of the soils in each group]

Woodland group	Expected height of dominant and codominant trees at 50 years of age			Seedling mortality	Plant competition	Equipment limitations	Erosion hazard
	Shortleaf and Virginia pine	Loblolly pine	White pine				
	Feet	*Feet*	*Feet*				
Group 1: Deep to moderately deep, well drained and moderately well drained soils on bottom lands.	82	95	105	Slight	Severe	Slight	Slight.
Group 2: Moderately deep to shallow, somewhat poorly drained soils on bottom lands and low stream terraces.	79	95	105	Slight	Severe	Moderate	Slight.
Group 3: Gently sloping to strongly sloping, deep to moderately deep, well-drained, severely eroded soils; fine sandy loam to clay loam surface layer over red clay loam to clay; on uplands and stream terraces.	68	84	98	Moderate	Slight	Slight	Slight to moderate.
Group 4A: Level to strongly sloping, deep to moderately deep, mostly well drained soils; sandy loam to loam surface layer over reddish fine sandy clay loam to clay; on uplands and stream terraces.	74	86	99	Slight	Moderate	Slight	Slight to moderate.
Group 4B: Chiefly gently sloping to strongly sloping, deep to moderately deep, mostly well drained and moderately well drained soils; loam and sandy loam surface soil over yellow, yellowish-brown, strong-brown, or yellowish-red sandy clay to fine sandy loam; on uplands and stream terraces.	70	86	99	Slight	Moderate	Slight	Slight to moderate.
Group 5: Moderately steep, deep to shallow, well-drained to somewhat excessively drained soils; loam to sandy loam surface layer over fine sandy clay loam to clay loam.	70	84	98	Slight	Moderate	Moderate	Moderate.
Group 6: Strongly sloping, shallow, well-drained to somewhat excessively drained soils; stony fine sandy loam to stony clay loam surface layer.	64	80	95	Slight	Moderate	Moderate	Moderate.
Group 7: Moderately steep, shallow, well-drained to somewhat excessively drained soils; stony clay loam to stony sandy loam surface layer over sandy clay loam to clay.	64	74	83	Slight	Moderate	Moderate	Moderate.
Group 8: Sloping to strongly sloping, deep to moderately deep, well-drained, severely eroded soils; clay loam surface layer over red to dark-red clay loam.	70	80	85	Moderate	Slight	Slight to moderate.	Moderate.
Group 9: Gently sloping to strongly sloping, deep to moderately deep, well-drained, moderately eroded soils; loam surface layer over red to dark-red clay or clay loam.	70	80	85	Slight	Severe	Slight to moderate.	Slight to moderate.
Group 10: Strongly sloping to moderately steep, shallow, well-drained to somewhat excessively drained soils; loam surface layer over a thin clay loam subsoil or loamy strata.	70	80	95	Slight	Severe	Slight	Moderate.
Group 11: Moderately steep, deep to moderately deep, well-drained, severely eroded soils; sandy clay loam surface layer over red sandy clay loam to clay loam.	60	78	92	Moderate	Slight	Moderate	Severe.

See footnote at end of table.

TABLE 3.—*Woodland suitability grouping of soils*—Continued

[Refer to text for a discussion of each woodland suitability group and for a list of the soils in each group]

Woodland group	Expected height of dominant and codominant trees at 50 years of age			Seedling mortality	Plant competition	Equipment limitations	Erosion hazard
	Shortleaf and Virginia pine	Loblolly pine	White pine				
	Feet	*Feet*	*Feet*				
Group 12: Steep, moderately deep to shallow, generally stony, well-drained to somewhat excessively drained soils; sandy loam to loam surface layer over sandy clay loam to clay loam.	64	70	91	Slight	Severe	Moderate	Severe.
Group 13: Sloping to strongly sloping, moderately deep to deep, well-drained, very severely eroded soils; fine sandy clay loam surface layer and subsoil.	58	80	95	Severe	Slight	Moderate	Severe.
Group 14: Deep, somewhat excessively drained, sandy soil on bottom lands	90	95	95	Slight	Slight	Slight	Slight.
Group 15: Very steep, shallow, well-drained to somewhat excessively drained soils; loam to sandy loam surface layer; stony in places; clay loam to clay subsoil.	50	68	85	Slight	Severe	Very severe	Severe.
Group 16: Shallow, poorly drained soils on low stream terraces and bottom lands.	54	(1)	(1)	Moderate	Severe	Severe	Slight.

[1] Not rated.

WOODLAND SUITABILITY GROUP 4A

This group consists of gently sloping to strongly sloping, deep to moderately deep soils. These soils are well drained to moderately well drained and occur on uplands and stream terraces. Erosion is slight to moderate. The surface soil ranges from loam to sandy loam, and the subsoil is reddish fine sandy clay loam to clay. The soils in this group cover about 22.9 percent of the county. They are—

Cecil sandy loam, 2 to 6 percent slopes, eroded.
Cecil sandy loam, 6 to 10 percent slopes.
Cecil sandy loam, 6 to 10 percent slopes, eroded.
Cecil sandy loam, 10 to 15 percent slopes.
Cecil sandy loam, 10 to 15 percent slopes, eroded.
Hiwassee fine sandy loam, 2 to 6 percent slopes, eroded.
Hiwassee fine sandy loam, 6 to 10 percent slopes, eroded.
Hiwassee fine sandy loam, 10 to 15 percent slopes, eroded.
Madison fine sandy loam, 2 to 6 percent slopes, eroded.
Madison fine sandy loam, 6 to 10 percent slopes.
Madison fine sandy loam, 6 to 10 percent slopes, eroded.
Madison fine sandy loam, 10 to 15 percent slopes.
Madison fine sandy loam, 10 to 15 percent slopes, eroded.
Masada fine sandy loam, 2 to 6 percent slopes, eroded.
Masada fine sandy loam, 6 to 10 percent slopes, eroded.
Tusquitee loam, 2 to 6 percent slopes.
Tusquitee loam, 6 to 10 percent slopes.
Tusquitee loam, 6 to 10 percent slopes, eroded.
Tusquitee loam, 10 to 15 percent slopes.
Tusquitee loam, 10 to 15 percent slopes, eroded.
Tusquitee stony loam, 6 to 10 percent slopes.
Tusquitee stony loam, 10 to 15 percent slopes.
Wickham fine sandy loam, 2 to 6 percent slopes, eroded.
Wickham fine sandy loam, 6 to 10 percent slopes, eroded.

***Figure 5.*—A planted stand of loblolly pine, 14 years old, on Madison fine sandy clay loam, 6 to 10 percent slopes, severely eroded. Although tilth is poor on severely eroded soils, good stands can be established if other conditions are favorable. Woodland suitability group 3.**

The average site index is 70 to 74 for shortleaf pine and Virginia pine, 86 for loblolly pine, and 99 for white pine.

Seedling mortality is slight, and plant competition is moderate. The development of a normal, fully stocked stand may be delayed by competition from other plants. These plants slow the initial growth of desired seedlings, but they do not prevent the development of adequate stands. Competing plants, however, should be suppressed by spraying with poison or by other special practices.

Equipment limitations are slight. Ordinary woodland equipment and machinery may be used except during and immediately after heavy rains.

The hazard of erosion is slight to moderate. These soils do not erode if timber is harvested with ordinary care.

WOODLAND SUITABILITY GROUP 4B

This group consists of nearly level to strongly sloping, deep to moderately deep soils on uplands and streams terraces. Most of these soils are well drained to moderately well drained, but the Colfax soils are somewhat poorly drained. The surface soil ranges from loam to sandy loam. The subsoil is yellow, yellowish-brown, strong-brown, or yellowish-red sandy clay to fine sandy loam. In some places the subsoil is mottled. The soils in the group occupy about 3.3 percent of the county. They are—

Altavista fine sandy loam, 0 to 2 percent slopes.
Altavista fine sandy loam, 2 to 6 percent slopes.
Altavista fine sandy loam, 2 to 6 percent slopes, eroded.
Appling sandy loam, 2 to 6 percent slopes, eroded.
Appling sandy loam, 6 to 10 percent slopes, eroded.
Colfax sandy loam, 2 to 6 percent slopes.
Colfax sandy loam, 6 to 10 percent slopes, eroded.
Habersham fine sandy loam, 2 to 6 percent slopes, eroded.
Habersham fine sandy loam, 6 to 10 percent slopes.
Habersham fine sandy loam, 6 to 10 percent slopes, eroded.
Habersham fine sandy loam, 10 to 15 percent slopes, eroded.
Halewood fine sandy loam, 6 to 10 percent slopes.
Halewood fine sandy loam, 10 to 15 percent slopes.
Halewood fine sandy loam, 2 to 6 percent slopes, eroded.
Halewood fine sandy loam, 6 to 10 percent slopes, eroded.
Louisburg sandy loam, 10 to 15 percent slopes, eroded.

The soils in woodland suitability group 4B have about the same seedling mortality, plant competition, and equipment limitations as have the soils in group 4A. The site index of most species on the soils in group 4B is also about the same as it is on the soils in group 4A. Southern pine, however, has slightly different site indexes on the soils of these two groups. The survival of trees is generally high on the soils in group 4B (fig. 6).

***Figure 6.*—A planted stand of shortleaf pine, 20 years old, on Habersham fine sandy loam, 10 to 15 percent slopes, eroded. Moderately high yields can be expected. Woodland suitability group 4B.**

WOODLAND SUITABILITY GROUP 5

This group consists of soils that are moderately steep, deep to shallow, and well drained to somewhat excessively drained. These soils are slightly eroded or moderately eroded. They have a loam to sandy loam surface layer and a fine sandy loam to clay subsoil. The soils in this group cover about 25.1 percent of the county. They are—

Cecil sandy loam, 15 to 25 percent slopes.
Cecil sandy loam, 15 to 25 percent slopes, eroded.
Clifton-Davidson complex, 15 to 25 percent slopes.
Halewood fine sandy loam, 15 to 27 percent slopes.
Louisa fine sandy loam, 15 to 25 percent slopes.
Louisburg sandy loam, 15 to 25 percent slopes.
Madison fine sandy loam, 15 to 25 percent slopes.
Madison fine sandy loam, 15 to 25 percent slopes, eroded.
Watauga loam, 15 to 25 percent slopes.

The average site index is 70 for shortleaf pine and Virginia pine, 84 for loblolly pine, and 98 for white pine.

Seedling mortality is slight, and plant competition is moderate. If they are not suppressed, competing plants may slow the initial growth of desired seedlings and delay the development of a fully stocked stand. To suppress these plants, spray with poison or use other practices to prepare the woodlots.

Equipment limitations are moderate. The use of equipment is limited by the steep slopes and by the risk of damaging the structure of the soils. Also, tree roots may be injured by equipment that is operated late in winter and in spring when the soils are wet. Because the hazard of erosion is moderate, roads, skidtrails, and landings need to be carefully selected so that erosion is not accelerated.

WOODLAND SUITABILITY GROUP 6

This group consists of strongly sloping, shallow, well-drained to somewhat excessively drained soils that have a stony fine sandy loam to stony clay loam surface layer. These soils are slightly eroded to severely eroded. They cover about 0.6 percent of the county. The soils in this group are—

Louisburg-Habersham stony fine sandy loams, 10 to 15 percent slopes.
Louisburg-Habersham stony fine sandy loams, 10 to 15 percent slopes, severely eroded.
Musella stony clay loam, 10 to 15 percent slopes, severely eroded.

The average site index is 64 for shortleaf pine and Virginia pine, 80 for loblolly pine, and 95 for white pine.

Seedling mortality is slight, but plant competition is moderate. To suppress undesirable plants, the woodlots should be sprayed with poison or treated in other ways.

The equipment limitation is moderate. It depends on how stony an area is and on how much rock crops out. The hazard of erosion is moderate, mainly because the soils are shallow and sloping.

WOODLAND SUITABILITY GROUP 7

This group consists of soils that are moderately steep, shallow, and well drained to somewhat excessively drained. These soils have a stony clay loam to stony sandy loam surface layer that is underlain by sandy clay loam to clay. The soils in this group cover about 2.8 percent of the county. They are—

Cecil stony sandy loam, 15 to 25 percent slopes.
Clifton-Davidson stony complex, 15 to 25 percent slopes.
Louisburg-Habersham stony fine sandy loams, 15 to 25 percent slopes.

Musella stony clay loam, 15 to 25 percent slopes, eroded.
Porters-Ashe stony loams, 15 to 25 percent slopes.

The average site index is 64 for Virginia pine and shortleaf pine, 74 for loblolly pine, and 83 for white pine.

Seedling mortality is slight, and plant competition is moderate. Competing plants may slow the initial growth of desired seedlings, but they do not prevent an adequate stand from developing. The competing plants should be suppressed by spraying them with poison or by other means.

Equipment limitations are moderate. The use of equipment is restricted by steep slopes and by stones or outcrops of rock.

The erosion hazard is moderate. Because the soils are shallow and steep, roads, skidtrails, and landings need to be located carefully so that erosion is not accelerated.

WOODLAND SUITABILITY GROUP 8

In this group are sloping to strongly sloping, deep to moderately deep soils that are well drained and severely eroded. The surface layer of these soils is clay loam and is underlain by red to dark-red clay loam. The soils in this group cover about 1.0 percent of the county. They are:

Lloyd clay loam, 6 to 10 percent slopes, severely eroded.
Lloyd clay loam, 10 to 15 percent slopes, severely eroded.

The average site index is 70 for shortleaf pine and Virginia pine, 80 for loblolly pine, and 85 for white pine.

Seedling mortality is moderate. Adequate stands of desired seedlings occasionally do not grow, and the bare spots should be replanted. Plant competition is slight.

Equipment limitations are slight to moderate. The structure of these soils may be damaged if they are crossed by heavy equipment when they are wet.

The erosion hazard is moderate, but if timber is carefully harvested, these soils do not erode.

WOODLAND SUITABILITY GROUP 9

This group consists of gently sloping to moderately steep, deep to moderately deep soils. These soils are well drained and moderately eroded or slightly eroded. The surface layer is loam, and the subsoil is red to dark-red clay or clay loam. The soils in this woodland suitability group cover about 1.6 percent of the county. They are:

Davidson loam, thin solum, 10 to 15 percent slopes, eroded.
Davidson loam, thin solum, 15 to 25 percent slopes.
Lloyd loam, 2 to 6 percent slopes, eroded.
Lloyd loam, 6 to 10 percent slopes.
Lloyd loam, 6 to 10 percent slopes, eroded.
Lloyd loam, 10 to 15 percent slopes, eroded.

The site index is 70 for shortleaf pine and Virginia pine, 80 for loblolly pine, and 85 for white pine.

Seedling mortality is slight, and plant competition is severe. Natural regeneration does not always provide adequate restocking of desired trees. Spraying, girdling, and other management may be needed to suppress competing plants. Equipment limitations and the erosion hazard are slight to moderate.

WOODLAND SUITABILITY GROUP 10

This group consists of strongly sloping to moderately steep, shallow soils that are well drained to somewhat excessively drained. These soils have a loam surface layer that is underlain by a thin clay loam subsoil or by loamy strata. The soils in this group cover about 0.7 percent of the county. They are—

Chandler loam, 15 to 25 percent slopes.
Porters loam, 10 to 15 percent slopes.
Porters loam, 15 to 25 percent slopes.

The average site index is 70 for shortleaf pine and Virginia pine, 80 for loblolly pine, and 95 for white pine.

Seedling mortality is slight, and plant competition is severe. Adequate stands of desired trees do not always regenerate naturally. Spraying, girdling, or other practices may be needed to suppress competing plants.

Equipment limitations are slight. Ordinary equipment and machinery may be used except during and immediately after heavy rains.

trails, and landings carefully so that erosion is not
The erosion hazard is moderate. Locate roads, skid-accelerated.

WOODLAND SUITABILITY GROUP 11

This group consists of moderately steep, deep to moderately deep, well-drained soils that are severely eroded. These soils have a sandy clay loam surface layer over red sandy clay loam to clay loam. The soils of this group cover more than 4.5 percent of the county. They are—

Cecil sandy clay loam, 15 to 25 percent slopes, severely eroded.
Madison fine sandy clay loam, 15 to 25 percent slopes, severely eroded.

The average site index is 60 for shortleaf pine and Virginia pine, 78 for loblolly pine, and 92 for white pine.

Seedling mortality is moderate. Occasionally adequate stands of desired seedlings are not obtained, and replanting is needed. Plant competition is slight.

Equipment limitations are moderate. The use of equipment is limited by the steep slopes and by the risk of damaging the structure of the soil, particularly when the soil is wet. About three-fourths of the time, however, these soils are dry enough for heavy equipment to be used. Deep gullies have formed and hinder operations to some degree. The gullying may increase on these severely eroded soils unless care is taken to prevent it.

WOODLAND SUITABILITY GROUP 12

This group consists of steep, moderately deep to shallow, generally stony soils that are well drained to somewhat excessively drained. These soils have a sandy loam to loam surface layer that is over sandy clay loam to clay loam. Steepness is the dominant characteristic of the soils in this group. These soils cover 16.7 percent of the county. They are:

Cecil sandy loam, thin solum, 25 to 60 percent slopes.
Cecil stony sandy loam, thin solum, 25 to 60 percent slopes.
Chandler loam, 25 to 60 percent slopes.
Clifton-Davidson complex, 25 to 60 percent slopes.
Clifton-Davidson stony complex, 25 to 60 percent slopes.
Davidson loam, thin solum, 25 to 60 percent slopes.
Halewood fine sandy loam, 25 to 60 percent slopes.
Louisa fine sand loam, 25 to 60 percent slopes.
Louisburg-Habersham stony fine sandy loams, 25 to 60 percent slopes.
Madison fine sandy loam, 25 to 60 percent slopes.
Porters loam, 25 to 60 percent slopes.
Porters-Ashe stony loams, 25 to 60 percent slopes.
Watauga loam, 25 to 60 percent slopes.

The average site index is 64 for shortleaf pine and Virginia pine, 70 for loblolly pine, and 91 for white pine.

Seedling mortality is slight, and plant competition is severe. Adequate stands of desired trees may not regenerat naturally. Spraying, girdling, and other management may be needed to suppress the competing plants.

Equipment limitations are moderate because slopes are very steep. The rough ground increases the cost of using machinery and maintaining roads, and it decreases production.

The erosion hazard is severe. It is nearly impossible to locate roads, skidtrails, and landings so that they do not increase erosion.

WOODLAND SUITABILITY GROUP 13

This group consists of sloping to moderately steep, moderately deep to deep, well-drained soils that are very severely eroded. The surface layer and the subsoil of these soils are fine sandy clay loam. The soils in this group cover about 0.7 percent of the county. They are:

Louisa fine sandy clay loam, 15 to 25 percent slopes, severely eroded.
Madison fine sandy clay loam, 6 to 10 percent slopes, very severely eroded.
Madison fine sandy clay loam, 10 to 15 percent slopes, very severely eroded.
Madison fine sandy clay loam, 15 to 25 percent slopes, very severely eroded.

The average site index is 58 for shortleaf pine and Virginia pine, 80 for loblolly pine, and 95 for white pine.

Seedling mortality is severe. Losses of the planted seedlings amounting to 25 to 75 percent can be expected. Replanting is almost always required. Because of the very severe erosion, the surface of these soils is generally bare. It dries out and bakes before the seedlings are well established, but losses can be reduced by planting early. Plant competition is slight.

Equipment limitations are moderate. The use of equipment is limited by the strong slopes and by the risk of damaging the structure of the soil, particularly in wet weather. About three-fourths of the time, however, these soils are dry enough for heavy equipment to be used. Deep gullies have formed and hinder operations to some degree.

The erosion hazard is severe, and the soils have lost all of the surface soil and most of the subsoil. Gullying may increase on these severely eroded soils unless care is taken to prevent it.

WOODLAND SUITABILITY GROUP 14

The only soils in group 14 are Buncombe loamy sands. They lie on bottom lands and are deep and somewhat excessively drained. Slopes range from 0 to 6 percent. These soils cover about 0.5 percent of the county.

The average site index is 90 for shortleaf pine and Virginia pine, 95 for loblolly pine, and 95 for white pine.

Seedling mortality, plant competition, and equipment limitations are slight. Ordinary woodland equipment and machinery may be used except during and immediately after heavy rains. The erosion hazard is slight, but this soil is likely to be overwashed and scoured.

WOODLAND SUITABILITY GROUP 15

This group consists of soils that are very steep, shallow, and well drained to somewhat excessively drained. The surface layer of these soils is loam to sandy loam and is underlain by clay loam to clay. Some of these soils are stony. Slopes range from 60 to 95 percent. The soils in this group make up slightly more than 2.6 percent of the county. They are:

Chandler loam, 60 to 95 percent slopes.
Clifton-Davidson stony complex, 60 to 90 percent slopes.
Louisa fine sandy loam, 60 to 90 percent slopes.
Porters loam, 60 to 80 percent slopes.
Porters-Ashe stony loams, 60 to 95 percent slopes.

The average site index is 50 for shortleaf pine and Virginia pine, 68 for loblolly pine, and 85 for white pine.

Seedling mortality is slight, and plant competition is severe. Adequate stands of desired trees may not regenerate naturally. Spraying, girdling, or other special management may be needed. Equipment limitations are very severe because of the extremely steep slopes. Ordinary harvesting methods are not practical, and other woodland practices are costly and not economical.

The erosion hazard is severe. Roads, skidtrails, and landings cause accelerated erosion. The harvested trees must be removed from these soils to less steep areas for pickup.

WOODLAND SUITABILITY GROUP 16

This group consists of shallow, poorly drained soils that are very strongly acid in most places. These soils slope from 0 to 2 percent and are on low stream terraces and bottom lands. They cover 0.6 percent of the county. The soils in this group are:

Roanoke fine sandy loam.
Wehadkee silt loam.

The average site index for these soils is 54 for shortleaf pine and Virginia pine, but the site index for loblolly pine and for white pine has not been estimated. Yellow-poplar grows rapidly.

Seedling mortality is moderate because the soils are wet. Generally it is not advisable to plant pine.

Plant competition is severe. Adequate stands of desired trees do not regenerate naturally. The site ought to be prepared by spraying, girdling, and other means to prevent hardwoods, shrubs, and weeds from overshading planted seedlings.

Equipment limitations are severe. Heavy loads should not be hauled across these soils when they are wet, for the soils yield. Heavy equipment can be used one-third to one-half of the time. Machinery may be damaged by frequent floods.

The erosion hazard is slight. These soils may be saturated for long periods, and the Wehadkee soil is likely to be flooded frequently. Little or no damage is caused by overwash or deposition.

Yield Data

Table 4 lists, according to stated site indexes and ages of trees, data on yields of marketable timber in well-stocked, naturally occurring, normal stands of loblolly pine and shortleaf pine. These data are based on published research (*6*). The yield information for Virginia pine is not identical to that for shortleaf pine, but it is similar.

TABLE 4.—*Yield data, in total volume per acre, for well-stocked, unmanaged, normal stands of shortleaf pine and loblolly pine that occur naturally*

Site index	Age in years							
	20	30	40	40	50	60	70	80
	Cords [1]	Cords [1]	Cords [1]	Bd. ft.[2] (Doyle)	Bd. ft.[2] (Doyle)	Bd. ft.[2] (Doyle)	Bd. ft.[2] (Doyle)	Bd. ft.[2] (Doyle)
Shortleaf Pine								
50	([3])	23	33	([3])	1, 600	3, 200	5, 050	7, 000
60	12	32	46	1, 550	4, 350	7, 600	10, 250	12, 700
70	18	41	56	4, 000	8, 650	12, 600	16, 250	19, 400
80	25	48	65	7, 650	13, 550	18, 850	23, 450	27, 550
Loblolly Pine								
60	12	25	35	1, 000	3, 000	5, 000	7, 000	8, 500
70	17	31	42	3, 500	6, 500	10, 000	12, 500	15, 000
80	22	38	51	6, 000	11, 500	16, 000	19, 500	22, 000
90	27	46	61	10, 000	16, 500	22, 000	26, 000	29, 000
100	32	53	71	14, 500	23, 000	29, 500	33, 000	35, 500

[1] Rough wood of trees at least 4 inches in diameter at breast height.

[2] Trees at least 9 inches in diameter at breast height.

[3] Not estimated.

Engineering Applications [4]

Soil engineering is a part of structural engineering and deals with soils as the foundation material on which structures rest and with soils used as a structural material. Generally, soils are used in the locality and in the condition they are found. A large part of soil engineering consists of locating the various soils, of determining their engineering properties and how those properties meet the requirements of the job, and of selecting the best material available for each job.

Engineers of the Georgia State Highway Department and the Soil Conservation Service collaborated with soil scientists of the Soil Conservation Service in preparing this section. These specialists combined their knowledge to interpret, from the results of laboratory tests and from field experience, soil conditions that apply to engineering. The information in this report can be used to:

1. Make studies of soil and land use that will aid in selecting and developing industrial, business, residential, and recreational sites.
2. Make preliminary estimates of the engineering properties of soils for use in planning agricultural drainage systems, farm ponds, irrigation systems, diversions, and terraces.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting locations for highways and airports, and in planning detailed surveys for the selected locations.
4. Locate sources of construction material.
5. Correlate the performance of engineering structures with soil mapping units and thus obtain information that is useful in designing and maintaining the structures.
6. Determine the suitability of the soils for cross-country movements of vehicles and construction equipment.
7. Supplement information from other maps and reports and from aerial photographs for the purpose of making maps and reports that can be used readily by engineers.
8. Make preliminary evaluation of the suitability of a particular area for construction purposes.

However, the maps and the descriptive report are somewhat generalized and should be used only in planning more detailed field surveys to determine the condition of the soil, in place, at the site of the proposed structure.

Much information useful to the engineers can be found in other parts of this report, particularly in the sections "General Soil Map," "How Soils Are Named, Mapped, and Classified," "Descriptions of Soils," and "Formation and Classification of Soils."

This report uses agricultural terms to describe soils and their uses in farming and related fields. Many of these terms have a meaning to agricultural workers that differs from the meaning understood by engineers. These terms are defined in the Glossary in their agricultural sense, and some of the most common ones are also defined here.

Aggregate, soil.—A cluster of primary soil particles held together by internal forces to form a clod or fragment.

Clay.—A size group of mineral particles less than 0.002 millimeter in diameter. Clay as a textural class consists of soil material containing 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Granular structure.—Individual grains grouped into spherical aggregates that have indistinct sides. Highly porous granules are commonly called crumbs.

[4] This section was written by R. W. BROWN, civil engineer, and E. L. HELMEY, agricultural engineer, SCS, and S. M. ROBERTSON, soil scientist, SCS.

Gravel.—A size group of coarse mineral particles varying in diameter from 2 millimeters to 3 inches. Fine gravel ranges from 2 millimeters to 0.5 inch in diameter.

Sand.—A size group of mineral particles ranging in diameter from 0.05 millimeter to 2.0 millimeters. As a textural class, sand consists of soil material that contains 85 percent or more sand and not more than 15 percent clay.

Silt.—A size group of mineral particles having diameters ranging from 0.002 millimeter to 0.05 millimeter. As a textural class, silt consists of soil material that contains 80 percent or more silt and less than 12 percent clay.

Soil.—The natural medium for the growth of land plants; composed of organic and mineral materials.

Subsoil.—Technically, the B horizon of soils with distinct layers; roughly, that part of the profile below plow depth in which roots normally grow.

Substratum.—Any layer beneath the solum, either conforming (C horizon) or nonconforming (D horizon).

Topsoil.—Surface soil material that is generally fairly high in organic matter; used to topdress roadbanks, gardens, and lawns.

Engineering Classification

AASHO classification system.—Most highway engineers classify soil materials according to the system approved by the American Association of State Highway Officials (*1*). In this system soil materials are classified in seven principal groups. The groups range from A–1, consisting of gravelly soils of high bearing capacity, to A–7, consisting of clayey soils having low strength when wet. Within each group the relative engineering value of the soil material is indicated by a group index number. These numbers range from 0 for the best materials to 20 for the poorest. The group index number is shown in parentheses following the soil group symbol in table 7.

TABLE 5.—*Description and estimated*

[Dashes indicate that properties named

Map symbol	Soil name	Description of soil and ground condition	Depth to bedrock	Depth to seasonally high water table	Depth from surface (typical profile)
			Feet	*Feet*	*Inches*
Alm	Alluvial land.	2 to 5 feet or more of moderately well drained to well drained or somewhat poorly drained, stratified alluvial material of varied texture; chiefly sand or loamy material recently deposited; in places contains beds of sand and gravel; on flood plains that are likely to be flooded frequently.	6–15	1 to 3	0 to 67
Avp	Alluvial land, wet.				
AkA	Altavista fine sandy loam, 0 to 2 percent slopes.	5 to 10 inches of fine sandy loam over 3 feet of clay loam; soils are moderately well drained and overlie old alluvial deposits; on low stream terraces.	8–15	3	0 to 9
AkB	Altavista fine sandy loam, 2 to 6 percent slopes.				9 to 32
AkB2	Altavista fine sandy loam, 2 to 6 percent slopes, eroded.				32 to 36+
AmB2	Appling sandy loam, 2 to 6 percent slopes, eroded.	5 to 12 inches of sandy loam over 2 to 4½ feet of sandy clay loam to sandy clay; soils are well drained and overlie unconsolidated, weathered gneiss and granite-gneiss that are mixed with schist in places; on low uplands.	6–15	8+	0 to 9
AmC2	Appling sandy loam, 6 to 10 percent slopes, eroded.				9 to 33
					33 to 40+
AwA	Augusta silt loam, 0 to 2 percent slopes.	8 to 15 inches of silt loam over about 2 feet of heavy silt loam to silty clay loam; soils are somewhat poorly drained and overlie alluvial deposits that vary in texture and in content of mica; on low stream terraces.	6–15	1	0 to 2
AwB	Augusta silt loam, 2 to 6 percent slopes.				2 to 15
					15 to 20
					20 to 36
Bfs	Buncombe loamy sands.	4 feet or more of somewhat excessively drained loamy sand (recent alluvium) on flood plains; underlain in places by beds of gravel at depths below 4 feet; mica flakes common throughout the profile.	10–16	2	0 to 48

Unified classification system.—Some engineers prefer to use the Unified soil classification system (7). In this system soil material is put into 15 classes that are designated by pairs of letters. These classes range from GW consisting of well-graded gravel, gravel and sand mixtures, and a little fine material, to Pt, consisting of peat and other highly organic soil materials.

Engineering Descriptions of Soils

In table 5 are descriptions of the soils in the county and estimates of their physical properties. The descriptions apply only to the uneroded and the moderately eroded soils in each series. The second layer of the profile described is normally the surface layer of the severely eroded soils.

For most series the depth to bedrock varies considerably, mainly because the resistance of the bedrock to weathering and the degree of erosion vary. The depth to a seasonally high water table of more than 8 feet cannot be estimated accurately and is listed as 8 or more. The depth from the surface is that of the typical profile.

The soil material in the main horizons is classified according to the texture terms used by the United States Department of Agriculture, and according to the AASHO and the Unified systems. Also listed for the horizons are the estimated percentages of material that will pass a No. 4 sieve, a No. 10 sieve, and a No. 200 sieve. Fragments larger than 3 inches across were not considered in estimating the percentages passing these sieves.

Estimates of available water are the number of inches of water needed to wet 1 foot of air-dried soil material. Permeability is estimated for the subsoil in place, without compaction. The rating for shrink-swell potential indicates how much the soil material changes in volume when its moisture content changes. This potential is estimated primarily on the basis of the amount and kind of clay contained. In general, soils classified as CH and A–7 have a high shrink-swell potential. Those with a low shrink-swell potential are clean sand and gravel, soils that contain small amounts of nonplastic to slightly plastic fines, and most other nonplastic to slightly plastic soils.

physical properties of soils

do not apply or were not estimated]

Classification			Percentage passing sieve			Structure	Available water	Permeability	Shrink-swell potential
USDA	AASHO	Unified	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
							Inches per foot of soil	*Inches per hour*	
Fine sandy loam to loamy fine sand.	A–2, A–4	SM	95 to 100	95 to 100	20 to 40	Single grain	1. 2	5. 0 to 10. 0	Low.
Fine sandy loam	A–4	SM	95 to 100	95 to 100	40 to 50	Granular	1. 4	5. 0 to 10. 0	Low.
Clay loam	A–7	CL	95 to 100	95 to 100	60 to 70	Subangular blocky.	1. 5	0. 2 to 0. 8	Moderate.
Clay loam	A–6	CL	95 to 100	95 to 100	50 to 60	Subangular blocky.	----------	0. 2 to 0. 8	Moderate.
Sandy loam	A–2	SM	90 to 100	90 to 100	25 to 35	Granular	1. 4	5. 0 to 10. 0	Low.
Sandy clay to sandy clay loam.	A–7	MH–CH	100	95 to 100	60 to 70	Subangular blocky.	1. 4	0. 2 to 0. 8	Moderate.
Saprolite	A–7	MH	100	95 to 100	50 to 60	Massive	----------	0. 8 to 2. 5	Low.
Silt loam	A–4	ML–CL	95 to 100	95 to 100	60 to 70	Granular	1. 5	2. 5 to 5. 0	Low.
Silt loam	A–4	ML–CL	95 to 100	95 to 100	65 to 75	Subangular blocky.	1. 5	0. 2 to 0. 8	Low.
Heavy silt loam	A–6	CL	95 to 100	95 to 100	70 to 80	Subangular blocky.	1. 6	0. 2 to 0. 8	Moderate.
Heavy silt loam	A–6	CL	95 to 100	95 to 100	70 to 80	Weak, subangular blocky to massive.	1. 6	0. 2 to 0. 8	Moderate.
Loamy sand	A–2	SM	95 to 100	95 to 100	20 to 35	Single grain	1. 2	5. 0 to 10. 0	Low.

TABLE 5.—*Description and estimated*

Map symbol	Soil name	Description of soil and ground condition	Depth to bedrock	Depth to seasonally high water table	Depth from surface (typical profile)
			Feet	*Feet*	*Inches*
CYC	Cecil sandy loam, 6 to 10 percent slopes.	6 to 16 inches of sandy loam over 2 to 5 feet of sandy clay loam to clay; well-drained soils developed in residuum chiefly from gneiss but mixed in places with schist, granite, quartzite, and basic rocks; on uplands. Surface layer is sandy clay loam in severely eroded areas. Stony soils contain stones throughout the profile and generally are shallower than the nonstony soils.	4–15	8+	0 to 16
CYD	Cecil sandy loam, 10 to 15 percent slopes.				16 to 36
CYE	Cecil sandy loam, 15 to 25 percent slopes.				36 to 48+
CuF	Cecil sandy loam, thin solum, 25 to 60 percent slopes.				
CYB2	Cecil sandy loam, 2 to 6 percent slopes, eroded.				
CYC2	Cecil sandy loam, 6 to 10 percent slopes, eroded.				
CYD2	Cecil sandy loam, 10 to 15 percent slopes, eroded.				
CYE2	Cecil sandy loam, 15 to 25 percent slopes, eroded.				
CZC3	Cecil sandy clay loam, 6 to 10 percent slopes, severely eroded.				
CZD3	Cecil sandy clay loam, 10 to 15 percent slopes, severely eroded.				
CZE3	Cecil sandy clay loam, 15 to 25 percent slopes, severely eroded.				
CaE	Cecil stony sandy loam, 15 to 25 percent slopes.				
CzF	Cecil stony sandy loam, thin solum, 25 to 60 percent slopes.				
CCE	Chandler loam, 15 to 25 percent slopes.	3 to 9 inches of somewhat excessively drained loam over loamy saprolite of mica schist that grades at varied depths to horizontal beds of mica schist; on mountain ridges and knobs.	1–4	8+	0 to 2
CCF	Chandler loam, 25 to 60 percent slopes.				2 to 4
CCG	Chandler loam, 60 to 95 percent slopes.				4 to 78+
Cfl	Chewacla fine sandy loam.	10 to 18 inches of somewhat poorly drained silt loam or fine sandy loam over stratified alluvial material; mica flakes common; subject to frequent overflow; on flood plains of streams.	6–15	1½	0 to 18
Csl	Chewacla silt loam.				18 to 36
CKE	Clifton-Davidson complex, 15 to 25 percent slopes.	3 to 4 inches of loam over 1 to 3 feet of clay loam to clay that contains as much as 10 percent of rock fragments; soils are well drained and overlie basic rocks, chiefly hornblende schist and diorite; on uplands. Stony soils contain stones throughout the profile. In a profile of a Clifton stony soil, the material below a depth of about 7 inches contains as much as 70 percent rock fragments.	1–6	1½	0 to 4
CKF	Clifton-Davidson complex, 25 to 60 percent slopes.				4 to 10
CLE	Clifton-Davidson stony complex, 15 to 25 percent slopes.				10 to 22
CLF	Clifton-Davidson stony complex, 25 to 60 percent slopes.				22 to 34+
CLG	Clifton-Davidson stony complex, 60 to 90 percent slopes.				
CiB	Colfax sandy loam, 2 to 6 percent slopes.	About 3 inches of sandy loam over 1½ to 3 feet or more of sandy clay; soils are somewhat poorly drained and overlie unconsolidated, weathered, light-colored granite and gneiss; on low uplands and at the base of slopes.	6–15	1½	0 to 3
CiC2	Colfax sandy loam, 6 to 10 percent slopes, eroded.				3 to 22
					22 to 62+
Con	Congaree silt loam	30 to 40 inches or more of well-drained silt loam to fine sandy loam over stratified alluvial material underlain in places by beds of sand or gravel; on flood plains of streams that occasionally overflow.	8–15	3	0 to 8
					8 to 30
Cng	Congaree soils, local alluvium	1 to 3 feet or more of well-drained fine sandy loam to loam (local alluvium) over medium- to fine-textured residual material; at the heads of draws.	6–15	3 to 8+	0 to 15
					15 to 20
					20 to 36+

physical properties of soils—Continued

Classification			Percentage passing sieve			Structure	Available water	Permeability	Shrink-swell potential
USDA	AASHO	Unified	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
							Inches per foot of soil	*Inches per hour*	
Sandy loam	A-4, A-2	SM	90 to 100	85 to 95	25 to 40	Granular	1. 4	2. 5 to 5. 0	Low.
Sandy clay loam to clay loam.	A-7	SM-SC, ML-CL.	95 to 100	95 to 100	45 to 60	Angular blocky.	1. 6	0. 8 to 2. 5	Moderate.
Sandy clay loam	A-2, A-7	SM, MH	100	100	30 to 70	Massive	1. 6		Low.
Loam	A-4	ML	95 to 100	95 to 100	60 to 70	Granular	1. 4	2. 5 to 5. 0	Low.
Loam	A-4	ML	95 to 100	95 to 100	65 to 75	Granular	1. 4	0. 8 to 2. 5	Low.
Micaceous saprolite.	A-7	CL	95 to 100	95 to 100	55 to 65	Massive		0. 8 to 2. 5	Low.
Silt loam	A-4	CL	95 to 100	95 to 100	60 to 70	Granular	1. 5	0. 8 to 2. 5	Low.
Silt loam	A-6	CL	95 to 100	95 to 100	50 to 70	Subangular blocky.	1. 5	0. 2 to 0. 8	Low.
Loam	A-4	SM-SC	95 to 100	90 to 100	40 to 50	Granular	1. 5	2. 5 to 5. 0	Low.
Clay loam	A-7	CL	95 to 100	95 to 100	55 to 65	Subangular blocky.	1. 6	0. 8 to 2. 5	Moderate.
Clay	A-7	MH-CH, CL.	95 to 100	95 to 100	70 to 80	Subangular blocky.	1. 3	0. 8 to 2. 5	High.
Saprolite	A-6	CL	95 to 100	90 to 100	50 to 60	Massive		0. 8 to 2. 5	Low.
Sandy loam	A-2, A-4	SM-SC	95 to 100	95 to 100	30 to 40	Granular	1. 4	2. 5 to 5. 0	Low.
Sandy clay	A-7	CL	95 to 100	95 to 100	55 to 65	Subangular blocky.	1. 6	0. 2 to 0. 8	Moderate.
Sandy clay and saprolite.	A-6	SC, CL	95 to 100	90 to 100	45 to 60	Massive		0. 2 to 0. 8	Low.
Silt loam	A-4	ML-CL	100	95 to 100	80 to 90	Granular	1. 5	2. 5 to 5. 0	Low.
Silt loam	A-4	ML	100	95 to 100	80 to 90	Subangular blocky.	1. 5	2. 5 to 5. 0	Low.
Fine sandy loam	A-4	ML	100	95 to 100	50 to 60	Granular	1. 4	2. 5 to 5. 0	Low.
Loam	A-4	ML	100	95 to 100	50 to 60	Weak granular	1. 4	2. 5 to 5. 0	Low.
Fine sandy clay loam.	A-4	ML	100	95 to 100	50 to 60	Subangular blocky.	1. 5	2. 5 to 5. 0	Low.

TABLE 5.—*Description and estimated*

Map symbol	Soil name	Description of soil and ground condition	Depth to bedrock	Depth to seasonally high water table	Depth from surface (typical profile)
			Feet	*Feet*	*Inches*
DnE	Davidson loam, thin solum, 15 to 25 percent slopes.	2 to 6 inches of loam over 2 to 5 feet or more of clay to clay loam; soils are well drained and overlie weathered, dark-colored rocks; on uplands. Bedrock is near the surface in some steep areas.	2–10	8+	0 to 5
DnF	Davidson loam, thin solum, 25 to 60 percent slopes.				5 to 13
DnD2	Davidson loam, thin solum, 10 to 15 percent slopes, eroded.				13 to 38 38 to 70+
HAC	Habersham fine sandy loam, 6 to 10 percent slopes.	16 to 25 inches of fine sandy loam over 5 to 10 inches of sandy clay loam; soils are well drained and overlie weathered quartzite and quartzitic gneiss, granite and schist; on uplands.	3–10	8+	0 to 10 10 to 21
HAB2	Habersham fine sandy loam, 2 to 6 percent slopes, eroded.				21 to 28
HAC2	Habersham fine sandy loam, 6 to 10 percent slopes, eroded.				28 to 64+
HAD2	Habersham fine sandy loam, 10 to 15 percent slopes, eroded.				
HEC	Halewood fine sandy loam, 6 to 10 percent slopes.	4 to 12 inches of fine sandy loam over 2 to 4 feet of fine sandy clay loam or clay loam; soils are well drained and overlie weathered mica schist and quartz mica schist; on uplands. A few angular quartzitic fragments may occur on and in the soil.	4–8	8+	0 to 6 6 to 11
HED	Halewood fine sandy loam, 10 to 15 percent slopes.				11 to 27
HEE	Halewood fine sandy loam, 15 to 25 percent slopes.				27 to 37
HEF	Halewood fine sandy loam, 25 to 60 percent slopes.				37 to 63
HEB2	Halewood fine sandy loam, 2 to 6 percent slopes, eroded.				
HEC2	Halewood fine sandy loam, 6 to 10 percent slopes, eroded.				
HQB2	Hiwassee fine sandy loam, 2 to 6 percent slopes, eroded.	4 to 6 inches of fine sandy loam over 3 to 5 feet of clay; soils are well drained and overlie old alluvial deposits that have many rounded pebbles in some places in the deeper layers; on high stream terraces. The surface layer is fine sandy clay loam in the severely eroded soils.	6–15	8+	0 to 4 4 to 42
HQC2	Hiwassee fine sandy loam, 6 to 10 percent slopes, eroded.				42 to 59+
HQD2	Hiwassee fine sandy loam, 10 to 15 percent slopes, eroded.				
HRC3	Hiwassee fine sandy clay loam, 6 to 10 percent slopes, severely eroded.				
HRD3	Hiwassee fine sandy clay loam, 10 to 15 percent slopes, severely eroded.				
LfC	Lloyd loam, 6 to 10 percent slopes.	4 to 6 inches of loam over 2 to 3 feet or more of clayey material; soils are well drained and overlie mixed, unconsolidated, dark- and light-colored rocks; on uplands. The surface layer is clay loam in the severely eroded soils.	2½–7	8+	0 to 4
LfB2	Lloyd loam, 2 to 6 percent slopes, eroded.				4 to 12
LfC2	Lloyd loam, 6 to 10 percent slopes, eroded.				12 to 30
LfD2	Lloyd loam, 10 to 15 percent slopes, eroded.				30 to 60+
LeC3	Lloyd clay loam, 6 to 10 percent slopes, severely eroded.				
LeD3	Lloyd clay loam, 10 to 15 percent slopes, severely eroded.				
LjE	Louisa fine sandy loam, 15 to 25 percent slopes.	10 to 18 inches of fine sandy loam grading to sandy loam that contains lenses of clay loam; soils are somewhat excessively drained and overlie partly weathered mica schist, talcose schist, or gneiss high in mica content. The surface layer is fine sandy clay loam in the severely eroded soils.	2–4	8+	0 to 10 10 to 18
LjF	Louisa fine sandy loam, 25 to 60 percent slopes.				18 to 36
LjG	Louisa fine sandy loam, 60 to 90 percent slopes.				
LkE3	Louisa fine sandy clay loam, 15 to 25 percent slopes, severely eroded.				

phys ical properties of soils—Continued

Classification			Percentage passing sieve			Structure	Available water	Permeability	Shrink-swell potential
USDA	AASHO	Unified	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
							Inches per foot of soil	*Inches per hour*	
Loam	A–6	SC	95 to 100	85 to 95	40 to 50	Granular	1. 4	0. 8 to 2. 5	Moderate.
Clay loam	A–7, A–6	CH	95 to 100	98 to 100	70 to 80	Subangular blocky.	1. 6	0. 8 to 2. 5	High.
Clay	A–7	CH	95 to 100	95 to 100	75 to 85	Angular blocky	1. 4	0. 2 to 0. 8	High.
Sandy clay and saprolite.	A–6	CL	95 to 100	95 to 100	55 to 70	Massive			Low.
Fine sandy loam	A–2	SM	90 to 100	85 to 95	20 to 35	Granular	1. 2–1. 4	2. 5 to 10. 0	Low.
Fine sandy loam	A–2	SM	95 to 100	90 to 100	20 to 35	Subangular blocky.	1. 4	2. 5 to 5. 0	Low.
Sandy clay loam	A–2, A–7	SM, SC, ML.	95 to 100	90 to 100	20 to 60	Angular blocky	1. 5	0. 8 to 2. 5	Low to moderate.
Saprolite	A–2, A–7	SM, ML	95 to 100	90 to 100	15 to 70	Massive		2. 5 to 5. 0	Low.
Fine sandy loam	A–2, A–4	SM	95 to 100	90 to 100	30 to 45	Granular	1. 4	2. 5 to 5. 0	Low.
Fine sandy loam	A–6	CL	95 to 100	90 to 100	50 to 60	Angular blocky	1. 4	0. 8 to 2. 5	Moderate.
Fine sandy clay loam to clay loam.	A–7	CL, CH	95 to 100	90 to 100	55 to 70	Angular blocky	1. 6	0. 2 to 2. 5	High.
Fine sandy clay loam	A–7	MH	95 to 100	90 to 100	50 to 65	Angular blocky	1. 6	0. 2 to 0. 8	Moderate.
Loam and saprolite.	A–6	CL				Massive		0. 2 to 0. 8	Low.
Fine sandy loam	A–4	SM–SC	95 to 100	90 to 100	40 to 50	Granular	1. 4	2. 5 to 5. 0	Low.
Clay	A–7	CL, CH	95 to 100	95 to 100	55 to 65	Angular blocky	1. 4	0. 8 to 2. 5	Moderate to high.
Clay loam	A–6	CL	95 to 100	95 to 100	50 to 60	Angular blocky	1. 5	0. 8 to 2. 5	Moderate.
Loam	A–6, A–4	SC	95 to 100	90 to 100	40 to 50	Granular	1. 4	2.5 to 5.0	Moderate.
Sandy clay loam	A–6	CL	95 to 100	90 to 100	60 to 70	Subangular blocky to angular blocky.	1. 6	0.8 to 2.5	Moderate.
Clay	A–7	MH–CH	95 to 100	90 to 100	65 to 75	Angular blocky.	1. 4	0.8 to 2.5	High.
Saprolite	A–7	MH–CH	95 to 100	90 to 100	50 to 65	Massive		0.5 to 2.5	Low.
Fine sandy loam	A–4	SC–SM	90 to 100	85 to 95	40 to 50	Granular	1. 4	2.5 to 5.0	Low.
Sandy loam	A–6, A–4	SC, MH	90 to 100	90 to 100	45 to 60	Granular to massive.	1. 4	0.8 to 2.5	Low.
Partly weathered mica schist.									

TABLE 5.—*Description and estimated*

Map symbol	Soil name	Description of soil and ground condition	Depth to bedrock	Depth to seasonally high water table	Depth from surface (typical profile)
			Feet	*Feet*	*Inches*
LnE	Louisburg sandy loam, 15 to 25 percent slopes.	9 to 30 inches of somewhat excessively drained sandy loam mixed with small rocks in the lower part of layer; underlain by unconsolidated, weathered, light-colored granite, gneiss, and quartzitic material. Stony soils contain stones throughout the profile. In places, as much as 50 percent of these stony soils consists of rock fragments.	0–4	8+	0 to 14
LnD2	Louisburg sandy loam, 10 to 15 percent slopes, eroded.				14 to 32
LHD	Louisburg-Habersham stony fine sandy loams, 10 to 15 percent slopes.				32 to 40
LHE	Louisburg-Habersham stony fine sandy loams, 15 to 25 percent slopes.				
LHF	Louisburg-Habersham stony fine sandy loams, 25 to 60 percent slopes.				
LHD3	Louisburg-Habersham stony fine sandy loams, 10 to 15 percent slopes, severely eroded.				
MjC	Madison fine sandy loam, 6 to 10 percent slopes.	3 to 6 inches of fine sandy loam over 20 to 30 inches of micaceous clay loam; soils are well drained and overlie unconsolidated, weathered quartz mica schist and mica schist; on uplands. The surface layer is fine sandy clay loam in the severely eroded soils.	3–10	8+	0 to 4
MjD	Madison fine sandy loam, 10 to 15 percent slopes.				4 to 31
MjE	Madison fine sandy loam, 15 to 25 percent slopes.				31 to 67
MjF	Madison fine sandy loam, 25 to 60 percent slopes.				
MjB2	Madison fine sandy loam, 2 to 6 percent slopes, eroded.				
MjC2	Madison fine sandy loam, 6 to 10 percent slopes, eroded.				
MjD2	Madison fine sandy loam, 10 to 15 percent slopes, eroded.				
MjE2	Madison fine sandy loam, 15 to 25 percent slopes, eroded.				
MkB3	Madison fine sandy clay loam, 2 to 6 percent slopes, severely eroded.				
MkC3	Madison fine sandy clay loam, 6 to 10 percent slopes, severely eroded.				
MkD3	Madison fine sandy clay loam, 10 to 15 percent slopes, severely eroded.				
MkE3	Madison fine sandy clay loam, 15 to 25 percent slopes, severely eroded.				
MkC4	Madison fine sandy clay loam, 6 to 10 percent slopes, very severely eroded.				
MkD4	Madison fine sandy clay loam, 10 to 15 percent slopes, very severely eroded.				
MkE4	Madison fine sandy clay loam, 15 to 25 percent slopes, very severely eroded.				
MoB2	Masada fine sandy loam, 2 to 6 percent slopes, eroded.	12 to 22 inches of moderately well drained fine sandy clay loam to sandy loam over old alluvium that, in places, contains as much as 30 percent or more of water-rounded quartz gravel; on stream terraces.	5–15	8+	0 to 22
MoC2	Masada fine sandy loam, 6 to 10 percent slopes, eroded.				22 to 36
MoC3	Masada fine sandy loam, 6 to 10 percent slopes, severely eroded.				36 to 47
					47 to 64

physical properties of soils—Continued

Classification			Percentage passing sieve			Structure	Available water	Permeability	Shrink-swell potential
USDA	AASHO	Unified	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
							Inches per foot of soil	*Inches per hour*	
Sandy loam	A–2	SM	90 to 100	90 to 100	25 to 35	Granular	1. 4	5. 0 to 10. 0	Low.
Sandy loam	A–2, A–4	SM–SC	80 to 90	75 to 90	30 to 40	Massive	1. 4	0. 8 to 2. 5	Low.
Rock (saprolite)									Low.
Fine sandy loam	A–4	ML–CL, SM–SC.	90 to 100	95 to 100	45 to 55	Granular	1. 4	2. 5 to 5. 0	Low.
Sandy clay loam to clay loam.	A–7–5	ML or MH.	95 to 100	100	70 to 90	Angular blocky	1. 5	0. 8 to 2. 5	Moderate.
Saprolite	A–5	ML	100	100	50 to 95	Massive		0. 8 to 2. 5	Low
Fine sandy loam	A–4	SM–SC	95 to 100	85 to 95	40 to 50	Granular	1. 4	2. 5 to 5. 0	Low.
Fine sandy clay loam to sandy clay loam.	A–7–6, A–6	CL	95 to 100	90 to 100	60 to 70	Angular blocky.	1. 6	0. 8 to 2. 5	Moderate.
Sandy loam	A–4, A–6	SC, CL	95 to 100	90 to 100	40 to 60	Angular blocky.	1. 4	0. 2 to 0. 8	Moderate.
Sandy loam	A–4, A–6	SC, CL	95 to 100	90 to 100	40 to 60	Angular blocky.	1. 4	0. 8 to 2. 5	Moderate.

TABLE 5.—*Description and estimated*

Map symbol	Soil name	Description of soil and ground condition	Depth to bedrock	Depth to seasonally high water table	Depth from surface (typical profile)
			Feet	*Feet*	*Inches*
MwE2	Musella stony clay loam, 15 to 25 percent slopes, eroded.	10 to 30 inches of well-drained stony clay loam over mixed acid and basic rock; on uplands. In places as much as 50 percent of these stony soils consists of rock fragments.	1–4	8+	0 to 17
MwD3	Musella stony clay loam, 10 to 15 percent slopes, severely eroded.				17 to 21 21 to 72+
PcD	Porters loam, 10 to 15 percent slopes.	6 to 10 inches of loam over 1½ to 3 feet of clay loam to loam; soils are well drained to somewhat excessively drained and overlie bedrock or boulders of granite and gneiss; on mountain ridgetops. The Porters-Ashe stony loams are stony throughout the profile and are underlain by bedrock or large boulders, commonly at a depth of less than 3 feet.	1–4	8+	0 to 6 6 to 16
PcE	Porters loam, 15 to 25 percent slopes.				
PcF	Porters loam, 25 to 60 percent slopes.				16 to 36
PcG	Porters loam, 60 to 80 percent slopes.				36+
PAE	Porters-Ashe stony loams, 15 to 25 percent slopes.				
PAF	Porters-Ashe stony loams, 25 to 60 percent slopes.				
PAG	Porters-Ashe stony loams, 60 to 95 percent slopes.				
Roa	Roanoke fine sandy loam.	4 to 7 inches of poorly drained fine sandy loam grading to fine sandy clay loam to silty clay loam over alluvial deposits; in slight depressions and on the lowest parts of low stream terraces.	4–8	2 to 5	0 to 4 4 to 9 9 to 22 22 to 36+
T1B	Tusquitee loam, 2 to 6 percent slopes.	5 to 12 inches of loam over 1 to 2 feet of clay loam to loam; soils are moderately well drained to well drained and overlie local alluvium; beds of gravel are below a depth of 4 feet in some places; micaceous in places; in draws and at the base of slopes. The stony soils contain stones throughout the profile; below a depth of about 2 feet, stones make up 50 to 60 percent of the material.	3–12	4 to 8+	0 to 9 9 to 26 26+
T1C	Tusquitee loam, 6 to 10 percent slopes.				
T1D	Tusquitee loam, 10 to 15 percent slopes.				
T1C2	Tusquitee loam, 6 to 10 percent slopes, eroded.				
T1D2	Tusquitee loam, 10 to 15 percent slopes, eroded.				
TmC	Tusquitee stony loam, 6 to 10 percent slopes.				
TmD	Tusquitee stony loam, 10 to 15 percent slopes.				
WaE	Watauga loam, 15 to 25 percent slopes.	8 to 12 inches of loam over 1 to 2 feet of clay loam; soils are well drained and overlie mica schist mixed with gneiss in some places; on uplands.	3–9	8+	0 to 11 11 to 25
WaF	Watauga loam, 25 to 60 percent slopes.				25 to 33+
Wea	Wehadkee silt loam.	5 to 7 inches of silt loam over about 1 to 1½ feet of poorly drained silt loam to clay loam material that grades to waterlogged alluvial deposits of varied texture; on flood plains that are subject to frequent overflow.	8–15	0 to ½	0 to 6 6 to 20 20 to 27 27 to 36+
WgB2	Wickham fine sandy loam, 2 to 6 percent slopes, eroded.	6 to 10 inches of fine sandy loam over 1 to 3 feet of sandy clay loam to sandy clay; soils are well drained and overlie several feet of old alluvial deposits of varied texture; on stream terraces. The surface layer is clay loam in the severely eroded soil.	6–15	8+	0 to 8
WgC2	Wickham fine sandy loam, 6 to 10 percent slopes, eroded.				8 to 14
WhC3	Wickham clay loam, 6 to 10 percent slopes, severely eroded.				14 to 22 22 to 28 28 to 36+

[1] Variable.

physical properties of soils—Continued

Classification			Percentage passing sieve			Structure	Available water	Permeability	Shrink-swell potential
USDA	AASHO	Unified	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
							Inches per foot of soil	*Inches per hour*	
Stony clay loam	A–7–6	MH–CH	65 to 85	60 to 80	50 to 65	Granular to subangular blocky.	1. 5	0. 8 to 2. 5	Moderate.
Stony clay loam	A–7–5	MH–CH	55 to 85	55 to 85	50 to 70	Massive	1. 5	0. 2 to 0. 8	Moderate.
Rock (saprolite)									
Loam	A–4	SM, ML	90 to 100	85 to 95	40 to 55	Granular	1. 4	2. 5 to 5. 0	Low.
Clay loam	A–6	CL	90 to 100	90 to 100	55 to 65	Subangular blocky.	1. 5	0. 8 to 2. 5	Low to moderate.
Loam and saprolite.	A–6	ML	90 to 100	85 to 95	50 to 60	Massive		0. 8 to 2. 5	Low.
Rock									
Fine sandy loam	A–4	ML	100	100	50 to 70	Subangular blocky to angular blocky.	1. 4	0. 2 to 0. 8	Low.
Fine sandy clay loam.	A–6	CL	100	100	60 to 75	Angular blocky to massive.	1. 6	0. 2 to 0. 8	Moderate.
Silty clay loam	A–6	CL	100	100	60 to 80	Angular blocky	1. 1	0. 05 to 0. 2	Moderate.
Silt loam	A–6	CL	100	100	60 to 75	Massive	1. 1	0. 05 to 0. 2	Moderate.
Loam	A–4	SM, ML	95 to 100	85 to 95	40 to 55	Granular	1. 4	0. 8 to 2. 5	Low.
Clay loam	A–6	CL	95 to 100	90 to 100	50 to 60	Subangular blocky.	1. 5	0. 2 to 0. 8	Moderate.
Loam	A–4	SM, ML	95 to 100	85 to 95	45 to 55	Subangular blocky.	1. 4	0. 2 to 0. 8	Low.
Loam	A–4	ML	95 to 100	85 to 95	50 to 60	Granular	1. 4	2. 5 to 5. 0	Low.
Clay loam	A–6	CL	95 to 100	90 to 100	60 to 70	Subangular blocky.	1. 5	0. 8 to 2. 5	Moderate.
Mica schist									
Silt loam	A–4	ML	100	100	80 to 90	Granular	1. 4	0. 8 to 2. 5	Low.
Silt loam	A–6	ML	100	100	85 to 95	Massive	1. 2	0. 5 to 0. 2	Moderate.
Sandy clay loam	A–6	ML–CL	100	95 to 100	60 to 85	Massive	1. 2	0. 05 to 0. 2	Moderate.
Silt loam	A–6	ML	100	100	70 to 95	Massive	1. 4	0. 05 to 0. 2	Moderate.
Fine sandy loam	A–4	SM, ML	95 to 100	90 to 100	45 to 60	Granular	1. 4	2. 5 to 5. 0	Low.
Sandy clay loam	A–6	CL	95 to 100	95 to 100	55 to 70	Subangular blocky.	1. 6	0. 8 to 2. 5	Moderate.
Sandy clay	A–6	CL	95 to 100	95 to 100	60 to 90	Angular blocky	1. 4	0. 2 to 0. 8	Moderate.
Sandy clay loam	A–6	CL	95 to 100	95 to 100	55 to 80	Angular blocky	1. 5	0. 8 to 2. 5	Moderate.
(1)	(1)	(1)	(1)	(1)	(1)	Massive	(1)	(1)	Moderate.

Engineering Interpretations of Soils

Table 6 gives estimates of the suitability of the soils for highway construction and for conservation engineering. It also rates the soils according to their suitability as drainage fields for septic tanks. The ratings are based on estimates and on interpretations of estimates given in table 5, on the actual test data in table 7, and on observation of the performance of soils in the field. Each series is rated *good*, *fair*, or *poor*, according to its suitability for various types of construction. If the rating is *fair* or *poor*, the hazard, or adverse factor, generally is described.

The suitability for grading in wet weather depends on the texture of the soil and the depth to the water table. Plastic, clayey soils are rated *poor* because they are difficult to work on and to work with when they are wet. Also rated *poor* are noncohesive fine sands and silts that have a high water table and a low bearing capacity.

The susceptibility of the soil to frost depends on the texture of the material, the depth to the water table during freezing weather, and the time that the temperature is below freezing. Temperature falls below freezing for only a few days in this county, and the soils are not deeply frozen. Silty soils and very fine sands that have a high

TABLE 6.—*Estimated suitability*

[Dashed lines indicate that rating

Soil series	Suitability for grading in wet weather	Susceptibility to frost action	Suitability as soil material for—		Suitability as source of—	
			Road subgrade	Road fill	Topsoil	Sand and gravel
Alluvial land	Poor; high water table	Moderate	Good	Good	Good	Good in places
Altavista	Fair; moderately high water table.	Slight	Fair	Fair	Good	Unsuitable
Appling	Fair; heavy, dense subsoil.	Slight	Fair	Fair	Good; poor if eroded.	Unsuitable
Augusta	Poor; high water table	Slight	Fair	Poor to fair; erodible.	Poor	Unsuitable
Buncombe	Good	Slight	Good	Good	Good	Good to poor
Cecil	Fair; heavy subsoil	Moderate	Fair	Good	Good; poor if eroded.	Unsuitable
Chandler	Good	Moderate	Poor to fair; erodible.	Fair	Good	Unsuitable
Chewacla	Poor; high water table	Slight	Fair	Poor to fair; erodible.	Poor	Unsuitable
Clifton-Davidson	Poor; highly plastic subsoil.	Moderate	Poor; plastic subsoil.	Poor; plastic subsoil.	Poor	Unsuitable
Colfax	Poor; high water table	Slight	Fair to poor	Fair to poor	Good	Unsuitable
Congaree	Poor; high water table	Slight	Fair	Fair; erodible	Good	Poor; sand or gravel may be present below a depth of 3 feet
Davidson	Fair; heavy subsoil	Moderate	Poor, plastic subsoil.	Poor; plastic subsoil.	Poor; high in clay, low in sand.	Unsuitable
Habersham	Good	Slight	Good	Good	Good	Unsuitable
Halewood	Fair; heavy subsoil	Slight	Fair	Fair	Good	Unsuitable
Hiwassee	Fair; heavy subsoil	Moderate	Fair to poor	Fair to poor	Fair; high in clay.	Poor; spotty deposits.
Lloyd	Fair; heavy subsoil	Moderate	Poor; plastic subsoil.	Poor	Fair; high in clay, low in sand.	Unsuitable
Louisa	Good	Slight	Good to fair	Good to fair	Good	Unsuitable

See footnotes at end of table.

water table are most susceptible, but their rating of frost susceptibility is only *moderate*.

The suitability of a soil for road subgrade and road fill depends on the texture of the soil and its natural content of water. Plastic soils that have a high shrink-swell potential are rated *poor* for subgrade. For fill they are rated *poor* or *fair*, depending on their content of water, and on how easy they are to handle, to dry, and to compact. Fine sands, silts, and other highly erodible soils are rated *poor* or *fair* for fill. To prevent the fills from washing away, fine sands and silts require gentle slopes, close control of moisture during compaction, and fast-growing vegetation on the side slopes. Generally, the rating of the soils in the county for road fill is somewhat better than that for road subgrade.

The suitability of the soils for vertical alinement in highway cuts depends on the texture and kind of material in the cut, the stability and strength of the soils, and the drainage and water conditions of the area. Soils that contain one or more of the following are rated *poor:* (1) Hard bedrock near the surface, (2) wet, highly plastic materials, (3) a high water table, (4) mucky or marshy areas, or (5) erodible areas. Soils are rated *fair* if they have only slight seepage, are very stony, or are moderately susceptible to erosion.

of soils for engineering uses

does not apply or is not needed]

Suitability for vertical alinement of highway cut	Suitability for farm ponds		Suitability for agricultural drainage	Suitability for irrigation	Suitability for terraces and diversions [1]	Suitability for waterways [2]	Suitability for septic tank drain field
	Reservoir area	Embankment					
----------	Fair to poor--	Fair to poor--	Good-------	Good----------	----------	----------	Poor; high water table.
Fair----------	Good--------	Good--------	----------	Good----------	Good------	Good------	Fair; water table may be high at times.
Fair; water may seep from deep strata.	Good--------	Good--------	----------	Good to poor---	Good------	Good------	Fair; water table may be high at times.
Poor; high water table.	Good--------	Good--------	Fair; slow permeability.	Fair to poor; slow permeability.	----------	Good------	Poor; slow permeability
----------	Poor; very rapid permeability	Poor; very rapid permeability	----------	Fair; low water-holding capacity.	----------	----------	Good.
Good----------	Good--------	Good--------	----------	Good to poor---	Good------	Good------	Good.
Fair; shallow to bedrock; steep slopes.	Good--------	Good--------	----------	----------	Good------	Good------	Good.
----------	Good--------	Good--------	Fair; high water table.	Good----------	----------	----------	Poor; high water table.
Poor; plastic subsoil; shallow to bedrock; steep slopes.	Good--------	Fair; high in clay, low in sand.	----------	Fair; moderately slow permeability.	Good------	Good------	Good.
Poor; high water table.	Good--------	Good--------	Fair; slow permeability.	Fair to poor; slow permeability.	Good------	Good------	Poor; slow permeability.
----------	Fair; may have layers of stratified sand.	Good--------	Good--------	Good----------	----------	----------	Poor; high water table.
Poor; plastic subsoil; steep slopes; shallow to bedrock in places.	Good--------	Fair; high in clay, low in sand.	----------	Fair; moderately slow infiltration.	Good------	Good------	Good.
Fair; may have rock substratum.	Good--------	Good--------	----------	Fair; low water-supplying capacity.	Good------	Good------	Good.
Fair----------	Good--------	Good--------	----------	Good to poor---	Good------	Good------	Good.
Good----------	Good--------	Fair---------	----------	Good to poor---	Good------	Good------	Good.
Poor; plastic subsoil; shallow to bedrock in places.	Good--------	Fair; high in in clay, low in sand.	----------	Fair to good; moderately slow infiltration.	Good------	Good------	Good.
Fair; shallow to bedrock; steep slopes.	Good--------	Good--------	----------	Poor----------	Poor; steep, shallow soil.	Poor; steep, shallow soil.	Good.

TABLE 6.—*Estimated suitability of soils*

Soil series	Suitability for grading in wet weather	Susceptibility to frost action	Suitability as soil material for—		Suitability as source of—	
			Road subgrade	Road fill	Topsoil	Sand and gravel
Louisburg	Good	Slight	Good	Good	Good	Unsuitable
Louisburg-Habersham	Good	Slight	Good	Good	Good	Unsuitable
Madison	Fair; heavy substratum	Moderate	Good to fair	Fair; erodible	Good; poor if eroded.	Unsuitable
Masada	Good	Slight	Good to fair	Good to fair	Good	Poor; spotty deposits.
Musella	Poor; heavy substratum or pockets.	Moderate	Poor; plastic subsoil.	Poor	Poor; high in clay, low in sand.	Unsuitable
Porters	Good	Slight	Good	Fair	Good	Unsuitable
Porters-Ashe	Good	Slight	Good	Fair	Good	Unsuitable
Roanoke	Poor; high water table	Slight	Poor to fair; moderately plastic.	Fair	Poor	Unsuitable
Tusquitee	Fair to poor; may have high water table.	Slight	Good	Fair	Good	Poor; bed of gravel below 4 feet in places.
Watauga	Good	Moderate	Fair	Fair	Good	Unsuitable
Wehadkee	Poor; high water table	Moderate	Poor; unstable when wet.	Poor; unstable when wet.	Poor	Unsuitable
Wickham	Fair; heavy subsoil	Moderate	Fair to poor; variable substratum.	Fair	Good	Unsuitable

[1] Ratings listed for series apply only to those soils in series that have slopes suitable for terracing.

Soil test data

To help evaluate the soils for engineering purposes, soil samples of the principal soil type of three series were tested according to standard procedures. The test data are given in table 7. Each soil type was sampled in three localities. The samples from the different localities vary in physical characteristics, but the data in table 7 probably do not show the maximum variation in the horizons of each of the soil series. The modal profile is the most typical of the soils in a series, as they occur in this county. The nonmodal profiles were sampled to show significant variations in characteristics, but variations that are within the concept of the series or of the mapping unit. All of the samples were from a depth of less than 8 feet; some profiles were sampled at less than 4 feet. The test data, therefore, may not be adequate for estimating the characteristics of soil materials in rolling or hilly areas where deep cuts are required.

The engineering soil classifications in table 7 are based on data obtained by mechanical analyses and by tests made to determine liquid limits and plastic limits. Mechanical analyses were made by the combined sieve and hydrometer methods. The percentage of clay obtained by the hydrometer method should not be used in naming textural classes of soils.

Formation and Classification of Soils

Soil is created by the forces of weathering and soil development acting on the parent material that was deposited or accumulated by geologic agencies. At any given time the characteristics of the soil depend on (1) the

for engineering uses—Continued

Suitability for vertical alinement of highway cut	Suitability for farm ponds		Suitability for agricultural drainage	Suitability for irrigation	Suitability for terraces and diversions [1]	Suitability for waterways [2]	Suitability for septic tank drain field
	Reservoir area	Embankment					
Poor to fair; hard bedrock may be present.	Fair; seepage may occur.	Good		Fair; low water-holding capacity.	Poor; steep or shallow.	Poor; steep or shallow.	Fair; bedrock may be near surface.
Poor to fair; bedrock may be present.	Good	Good		Fair; low water-holding capacity.	Poor; steep or shallow.	Poor; steep or shallow.	Fair; low water-holding capacity or shallow to bedrock.
Fair; erodible	Good	Good		Good to poor	Good	Good	Good.
Good	Good	Good		Good	Good	Good	Good.
Poor; moderately shallow to bedrock; plastic subsoil; steep slopes.	Good	Fair; high in clay, low in sand.		Fair; moderately slow infiltration.	Poor; steep or shallow.	Poor	Poor; shallow to bedrock.
Poor; shallow to bedrock; steep slopes.	Good	Good		Poor	Poor; steep or shallow.	Poor; steep or shallow.	Fair; steep or shallow.
Poor; shallow to bedrock steep slopes.	Good	Good		Poor	Poor; steep or shallow.	Poor; steep or shallow.	Fair; steep or shallow.
Poor; high water table.	Good	Poor; poorly graded grains.	Poor; slow permeability.	Poor; slow infiltration.		Fair; low amount of fall.	Poor; high water table.
Fair; may have high water table.	Good	Good	Good	Good	Good	Good	Fair; moderately slow permeability.
Fair; shallow to bedrock.	Good	Good		Good	Good	Good	Good.
	Fair; may have deep layers of stratified sand.	Fair; poorly graded grains.	Poor; slow permeability.	Poor; slow infiltration			Poor; high water table.
Good	Good	Good		Good	Good	Good	Good.

[2] Ratings listed for series apply only to those soils on uplands and terraces that are not steep or eroded.

physical and mineralogical composition of the parent material; (2) the climate under which the soil material has accumulated and has existed since accumulation; (3) the plant and animal life on and in the soil; (4) the relief, or lay of the land; and (5) the length of time the forces of development have acted on the material.

The five soil-forming factors are interdependent; each modifies the effects of the others. Climate and vegetation are the active forces of soil genesis, but the effects of climate and vegetation are influenced by relief. Relief affects the surface drainage, the amount of water that percolates through the soil, erosion, and the vegetation of the soil. The kind of soil that develops is affected by the parent material, which also modifies the effects of climate and vegetation. In some places the kind of profile that forms is determined almost entirely by the nature of the parent material. Finally, time is required for the development of all soils. The length of time that the forces of soil formation have worked is reflected by the degree that the soil has developed into a body with well-defined horizons.

The factors of soil genesis are so closely interrelated in their effects that few generalizations can be made about one factor unless conditions are specified for the other four. The interrelations of these factors are so complex that many of the soil-development processes are unknown.

This section tells how the outstanding morphological characteristics of the soils in Habersham County are related to the factors of soil formation. The first part describes the factors of soil formation in Habersham County. The second part tells how the soils are classified in higher categories. Also in this part, the soil series are placed in great soil groups and their morphology is discussed.

TABLE 7.—*Engineering test data* [1] *for soil*

Soil name and location	Parent material	Bureau of Public Roads report number	Depth	Horizon	Moisture-density [2]	
					Maximum density	Optimum moisture
			Inches		*Lb. per cu. ft.*	*Percent*
Cecil sandy loam:						
7 miles north of Clarkesville (modal)	Gneiss and schist.	S35283	0–5	A_p	116	13
		S35284	16–26	B_2	108	19
		S35285	33–43	C	117	14
9 miles northwest of Clarkesville (clayey B horizon).	Nonisotropic gneiss.	S35286	0–7	A_p	120	12
		S35287	12–19	B_2	103	21
		S35288	25–50+	C	100	22
12 miles north of Clarkesville (light-textured B horizon).	Nonisotropic gneiss.	S35289	0–4	A_1	108	15
		S35290	15–24	B_2	108	19
		S35291	28–73	C	117	13
Habersham fine sandy loam:						
11.2 miles north of Clarkesville, 5.6 miles north of intersection of State Route 17 and U.S. Highway 441 (modal).	Quartzite and gneiss.	S35274	0–4	A_1	121	11
		S35275	10–16	B_1	128	9
		S35276	21–28	B_3	111	16
1 mile south of Tallulah Gorge (heavy, weathered B_2 horizon).	Quartzite and gneiss.	S35277	0–7	A_p	123	10
		S35278	25–37	B_{22}	100	23
		S35279	37–52	B_3	106	20
0.8 mile north of Habersham (light textured).	Quartzite and gneiss.	S35280	0–5	A_p	121	11
		S35281	9–26	B_3	119	11
		S35282	26–34	C	114	12
Madison fine sandy loam:						
2 miles west of Demorest (modal)	Nonisotropic mica schist and schist.	S35292	0–4	A_p	111	15
		S35293	7–16	B_2	98	24
		S35294	31–67+	C	107	18
0.7 mile north of Mt. Airy-Demorest Road (intergrades toward Lloyd).	Mica schist.	S35295	0–5	A_p	113	15
		S35296	8–20	B_2	106	20
		S35297	30–70+	C	98	23
0.5 mile northeast of Hollywood (intergrades toward Cecil).	Nonisotropic mica schist, schist, or gneiss.	S35298	0–4	A_p	110	15
		S35299	10–19	B_2	99	23
		S35300	31–91+	C	105	20

[1] Tests performed by the Bureau of Public Roads in accordance with standard procedures of the American Association of State Highway Officials (AASHO) (*1*).

[2] Based on the Moisture-Density Relations of Soils Using a 5.5-lb. Rammer and 12-inch Drop, AASHO Designation: T 99–57, Method A or C. (Method A was used when the sample contained no particles retained on No. 4 sieve; Method C was used for the other samples.)

[3] Mechanical analyses according to the AASHO Designation T 88–54. Results by this procedure frequently differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter.

Formation of Soils in Habersham County

Red-Yellow Podzolic soils dominate in the southern part of Habersham County, which is in the Upper Piedmont Plateau. In the northern part of the county the southern extremity of the region of Gray-Brown Podzolic soils is marked by the escarpment of the Blue Ridge mountains.

Parent materials and parent rock

The parent materials of the soils of Habersham County are of two kinds: (1) materials residual from the weathering of rock in place, and (2) materials transported by water and laid down as deposits of clay, silt, sand, and larger rock fragments. The residual materials are related directly to the underlying rock from which they were derived; the transported materials are related to the soils or rocks from which they fell or were washed.

The parent materials that weathered in place consist of the residuum of consolidated metamorphic rock. Geologically, the rock is very old. No evidence of fossils has been shown.

The soils that formed from residual materials are generally related to particular rock formations or parts of rock formations. The Cecil soils were commonly derived from ordinary gneiss; the Madison soils, from schist; and the Lloyd soils, from mixed acid and basic rock. Habersham soils are related to quartzitic material.

Some of the characteristics of the parent rock are reflected in the soils that formed from transported material. The Congaree, Chewacla, and Wehadkee soils consist entirely of material washed from soils on uplands and have

samples taken from nine soil profiles

Mechanical analyses [3]						Liquid limit	Plasticity index	Classification	
Percentage passing sieve—			Percentage smaller than—					AASHO[4]	Unified [5]
No. 4 (47 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm)	0.05 mm.	0.005 mm.	0.002 mm.				
91	90	28	24	14	10	(6)	(6)	A–2–4(0)	SM.
----------	100	50	47	35	33	41	14	A–7–6(5)	SM–SC.
----------	100	33	28	18	16	(6)	(6)	A–2–4(0)	SM.
----------	100	39	35	22	19	22	5	A–4(1)	SM–SC.
----------	100	65	62	51	47	49	20	A–7–6(11)	ML–CL.
----------	100	67	63	42	36	53	18	A–7–5(12)	MH.
----------	100	36	32	16	11	(6)	(6)	A–4(0)	SM.
----------	100	50	48	37	34	45	17	A–7–6(6)	SM–SC.
----------	100	27	23	13	11	(6)	(6)	A–2–4(0)	SM.
91	88	31	27	15	12	(6)	(6)	A–2–4(0)	SM.
95	93	29	25	15	11	(6)	(6)	A–2–4(0)	SM.
97	91	46	44	36	34	42	16	A–7–6(4)	SM-SC.
89	88	27	25	14	11	(6)	(6)	A–2–4(0)	SM.
----------	100	69	67	57	52	48	18	A–7–5(11)	ML.
----------	100	61	58	42	36	42	11	A–7–5(6)	ML.
95	94	24	21	8	7	(6)	(6)	A–2–4(0)	SM.
99	99	21	18	11	9	(6)	(6)	A–2–4(0)	SM.
----------	100	19	16	6	4	(6)	(6)	A–2–4(0)	SM.
----------	100	73	71	54	49	59	24	A–7–5(17)	MH.
99	96	51	47	28	21	35	9	A–4(3)	ML-CL.
----------	100	53	48	23	19	44	9	A–5(4)	ML.
97	91	76	73	31	24	31	8	A–4(8)	ML-CL.
99	97	87	84	44	35	47	16	A–7–5(12)	ML.
----------	100	91	88	25	17	50	10	A–5(10)	ML.
----------	100	47	43	25	20	30	8	A–4(2)	SM-SC.
----------	100	72	70	58	53	46	17	A–7–6(11)	ML.
----------	100	56	53	35	28	43	12	A–7–5(5)	ML.

In the SCS soil survey procedure the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses in this table are not suitable for use in naming textural classes for soils.

[4] Based on the Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, AAHSO Designation: M 145–49.

[5] Based on the Unified Soil Classification System, Tech. Memo. No. 3–357, v. 1, Waterways Experiment Station, Corps of Engineers, March 1953 (7).

[6] Nonplastic.

some characteristics of those soils. Soils on bottom lands that were formed from micaceous materials washed from uplands commonly have mica flakes in their profile.

A fairly consistent relationship exists between the parent materials and some soil characteristics. However, other soil characteristics, especially those of regional significance from the standpoint of soil genesis, cannot be correlated with the kinds of parent material and must be attributed to other factors.

Climate

The climate of Habersham County is temperate and continental. Summer is long and warm, and winter is short and fairly mild. Rainfall is relatively high throughout the county. The moderately high temperatures favor rapid chemical reactions in the soils, which are moist most of the time. Because of the high rainfall, most of the soluble materials are leached from the soils. The less soluble materials and colloidal matter are translocated downward in the soils. The soils are frozen, though not deeply, for short periods, and this freezing induces further weathering and further translocation of materials.

The climate varies somewhat within the county. Locally, some variations in temperature may be caused by differences in elevation. The mountains are cooler than the plateau. In the mountains, the growing season is 2 to 3 weeks shorter than it is on the plateau and the soil is frozen for longer periods. The variations between the soils of the plateau and those of the mountains are partly the result of the differences in climate and partly the result of differences in relief and other soil-forming factors. Because the climate is relatively uniform on the plateaus and in the mountains, it alone plays a small direct part in forming distinguishing characteristics in the soils

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within either of these areas. The climate has not been conducive to the accumulation of so much organic matter in the surface soil as it has in the prairie or some other region. Consequently, the surface soil has not been colored much by decomposed organic matter below a depth of 2 inches.

Plant and animal life

Higher plants, micro-organisms, earthworms, and other forms of life that live on and in the soil contribute to its morphology. They induce changes that, among other things, depend on the kinds of life and the life processes peculiar to each. The kinds of plants and animals that live on and in the soil are determined by climate, parent material, relief, age of the soil, and other factors of environment. The effects of climate are most apparent in determining the kinds of plants that will grow on well-drained, well-developed soils, but they are not always most important. Climate, therefore, has a powerful indirect effect on the development of soils.

The natural vegetation on the well-drained, well-developed soils was dominantly deciduous hardwoods, chiefly oak, chestnut, and hickory, with some pine intermixed. There were differences in the density of stands, the proportions of the species, and the ground cover. Some of the greater differences in stands, species, and cover were between the forest of the plateaus and the forest of the valleys. These differences were not only the result of variations in climate but also were the result of variations in the kinds of soil that developed. The well-drained, well-developed soils, however, have few marked differences in morphology that are the result of differences in vegetation.

The trees that commonly grow in this area are moderately deep to deep feeders on plant nutrients. They are chiefly deciduous, but among the species the amount of plant nutrients that their leaves contain ranges considerably. The leaves of deciduous trees generally contain a larger quantity of bases and phosphorus than those of coniferous trees. The trees of Habersham County, therefore, transfer a large amount of essential plant nutrients from the lower part of the soil to the upper part. In this way they retard some of the depleting action of percolating waters.

Organic material is added to the soil in the form of dead leaves, twigs, roots, and entire plants. Most of it is added to the upper part of the soil where it is acted upon by micro-organisms, earthworms, and other forms of life, and by direct chemical reaction. The rate of decomposition of this material is fairly rapid, partly because of the favorable temperature and moisture conditions and the favorable character of the organic material itself. The organic material, however, does not accumulate so much in warm sites as it does in cooler regions under similar drainage conditions. Little is known of the micro-organisms, earthworms, and other life in the soil, but their importance is probably no less than that of the higher plants.

Relief and age

Relief, or lay of the land, varies from place to place in Habersham County. Because of these variations, different soils may have developed from the same parent material. Relief affects the formation of soils by affecting internal drainage, runoff, the rate of erosion, and other results of water action.

Generally, the longer the soil has remained in place, the more fully developed the soil profile will be. Because of differences in parent material, relief, and climate, however, some soils mature more slowly than others. Alluvial soils are immature because the transported parent materials are young and new materials are deposited periodically. Soils on steep slopes are also likely to be immature because geologic erosion removes the soil as fast as it accumulates. Some kinds of parent rock are so resistant to weathering that soil development is very slow, even though other conditions are favorable. A mature soil is one that has well-developed A and B horizons that were produced by the natural processes of soil formation. An immature soil has little or no horizon differentiation.

Classification of Soils

The three soil orders—zonal, intrazonal, and azonal—are classes in the highest category of soil classification. Each of these classes consists of a number of great soil groups. Great soil groups are groups of soils that have profiles with many features in common. The section "How Soils are Named, Mapped, and Classified" describes how soils are classified in the lower categories.

Zonal soils are well drained and are well developed. In their development they reflect the dominant influence of climate and vegetation over that of parent material and relief. The zonal soils of Habersham County have formed under fairly similar conditions of climate and vegetation that influenced development more than relief has influenced it. Because of similar climate and vegetation, each zonal soil that developed in the county has many characteristics common to all members of the group.

Undisturbed zonal soils have a surface layer of organic debris in various stages of decomposition. They have a dark-colored A_1 horizon. The A_2 horizon is lighter colored than is either the A_1 or the B. The B horizon normally is uniformly red, yellow, or brown. It is finer textured than the A_1 or A_2 horizon. Among the different soils the C horizon varies in color and texture. Normally it is light red, or yellow variegated with gray or brown.

In most zonal soils of Habersham County the content of silica decreases with increasing depth and that of alumina and of iron increases. The content of organic matter is moderate in the A_1 horizon, is less than moderate in the A_2 horizon, and is very low in the B and C horizons. Within the solum zonal soils are low in bases and phosphorus. The loss on ignition is generally low and indicates a low content of tightly held water. The soils are medium acid, strongly acid, or very strongly acid. In general the quantity of sand decreases with increasing depth from the A_1 horizon through the B_2 horizon, and the quantity of clay and colloids increases. The colloidal content of the B horizon is much higher than that of the A_2 horizon.

Intrazonal soils occur in nearly level areas where both internal and external drainage are restricted, or where geologic erosion is very slow. These soils are associated geographically with zonal soils. They have formed from

materials that have been in place a long time, and their profile is fairly well developed. In Habersham County the characteristics of intrazonal soils generally are the results of the effects of nearly level relief that has greatly influenced the effects of the parent material and the vegetation.

Azonal soils are young and only partly developed. They are developing from parent material that has been in place for only a short time, or their development is impeded by poor drainage or other factors. They have poorly defined or no genetic horizons. In Habersham County the azonal soils are characterized by (1) an A_1 horizon that is moderately dark to very dark in color and fairly high in organic matter; (2) the absence of a well-developed B horizon or zone of illuviation; and (3) parent material that is generally lighter in color than the A_1 horizon. The parent material of the azonal soils may be similar to the A_1 horizon in texture, or it may be finer or coarser. Azonal soils are sometimes called AC soils because they do not have a B horizon or have only an incipient one.

The soils of each of the three soil orders may be derived from similar kinds of parent material. Within any one of the soil orders in Habersham County, the major differences among the soils appear to be closely related to differences in the parent materials of the soils. The depth of soils that developed over parent rock from residual materials partly depends on (1) the resistance of rock to weathering; (2) the amount of residue that is left after weathering; and (3) the rate of geologic erosion. The chemical and physical nature of the parent material modifies the rate and direction of the changes that result from climate and vegetation. The parent material also influences the kind of vegetation that grows on the soil. Figure 7 shows the location of the Cecil, Congaree, Lloyd, Hiwassee, Madison, and Porters soils in relation to their parent materials.

In table 8 the soil series are placed in soil orders and great soil groups, and for each series are given a characteristic profile description, topographic position, drainage, slope, and parent materials. The great soil groups represented in Habersham County are discussed in the following pages.

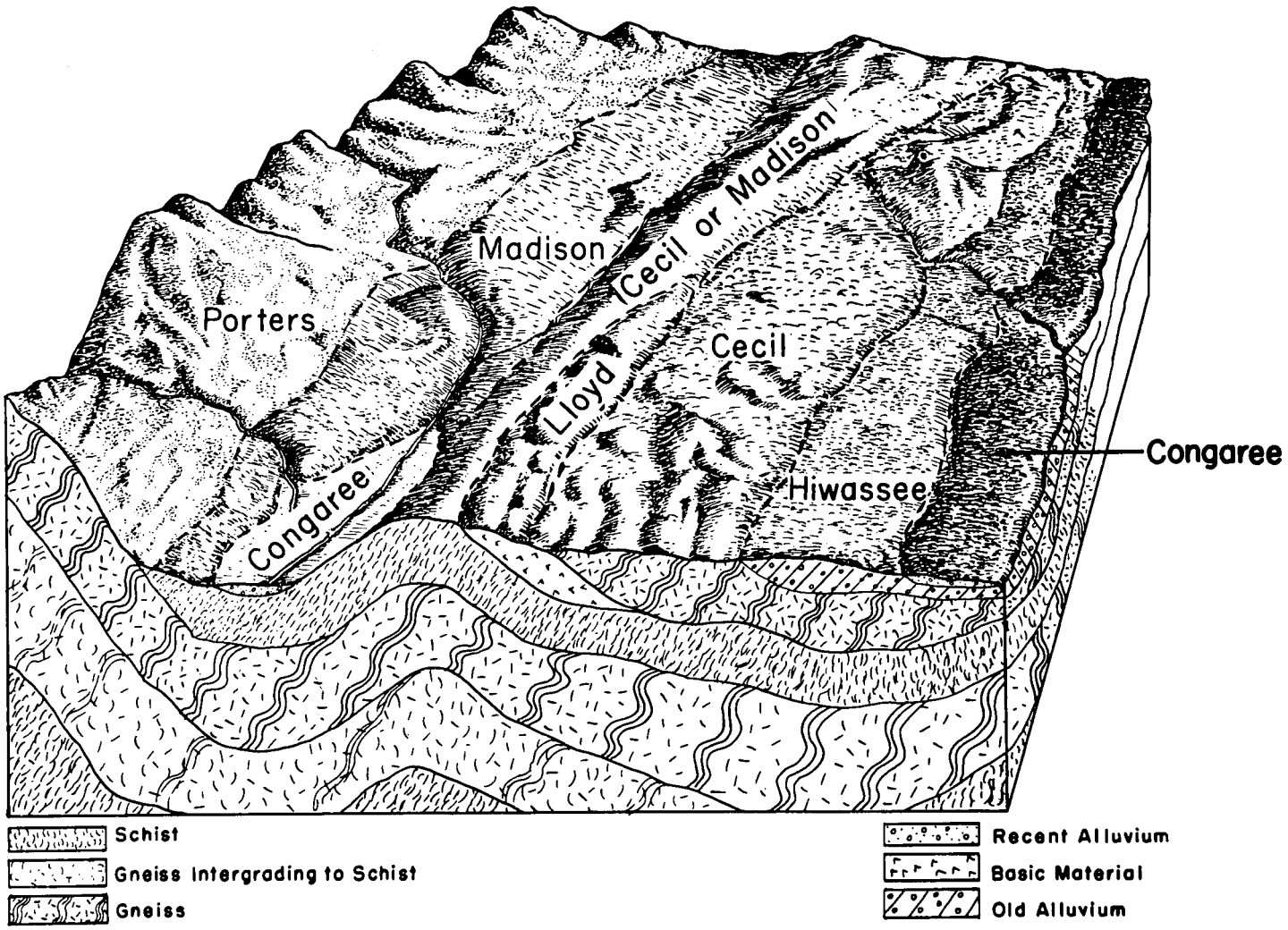

Figure 7.—Location of some soil series in relation to their parent materials.

TABLE 8.—*Classification of the*

ZONAL

Great soil group and soil series	Brief profile description [1]
Red-Yellow Podzolic soils:	
1. Representative:	
Altavista	Light olive-brown fine sandy loam over yellow clay loam; commonly mottled at a depth of about 22 inches.
Appling	Yellowish-brown sandy loam over yellowish-brown to yellowish-red sandy clay loam to sandy clay; commonly mottled at a depth of about 30 inches.
Cecil	Reddish-brown to yellowish-brown sandy loam over red sandy clay loam to clay loam
Clifton	Very dark grayish-brown loam over yellowish-red clay loam to clay
Habersham	Yellowish-brown fine sandy loam over brown to strong-brown fine sandy loam to fine sandy clay loam.
Halewood	Yellowish-brown fine sandy loam over strong-brown to yellowish-red fine sandy loam to clay loam; lower part of subsoil may be mottled.
Madison	Reddish-brown fine sandy loam over red sandy clay loam to clay loam; many mica flakes.
Masada	Grayish-brown to dark grayish-brown fine sandy loam over yellowish-brown to strong-brown fine sandy clay loam to sandy clay loam; mottled with red in the lower part.
Wickham	Dark grayish-brown fine sandy loam over yellowish-red to reddish-yellow sandy clay to sandy clay loam.
2. With some characteristics of Reddish-Brown Lateritic soils:	
Lloyd	Reddish-brown to dark reddish-brown loam over dark-red to red sandy clay to clay
3. With some characteristics of Low-Humic Gley soils:	
Augusta	Thin, dark grayish-brown silt loam over light olive brown to light-gray, mottled silt loam
Colfax	Grayish-brown sandy loam over yellowish-brown sandy clay
Gray-Brown Podzolic soils:	
1. Representative:	
Watauga	Brownish-yellow loam over yellowish-brown to strong-brown clay loam
Tusquitee	Dark grayish-brown to yellowish-brown loam over yellowish-brown to strong-brown clay loam.
2. With some characteristics of Lithosols:	
Porters	Dark yellowish-brown to strong-brown loam over thin, brown to dark-brown clay loam
Reddish-Brown Lateritic soils:	
1. Representative:	
Davidson	Dark reddish-brown loam over dark-red clay loam to clay
Hiwassee	Dark reddish-brown fine sandy loam over thick, dark-red clay loam to clay
2. With some characteristics of Lithosols:	
Musella	Red stony clay loam over thin, dark-red clay loam; depth to bedrock variable, but mostly shallow.

INTRAZONAL

Low-Humic Gley soils:	
Roanoke	Dark grayish-brown fine sandy loam over light olive-brown fine sandy clay loam to silty clay loam, grading to light greenish-gray, highly mottled silty clay loam.
Wehadkee	Reddish-brown silt loam overwash, about 6 inches thick, over dark grayish-brown, mottled silt loam to silty clay loam, grading to very dark gray.

See footnotes at end of table.

soil series by higher categories

Soils

Topographic position	Soil drainage	Slope range	Parent material
		Percent	
Low stream terraces	Moderately good	0 to 6	Old general alluvium.
Upland slopes and ridges	Good	2 to 10	Residuum from aplitic gneiss and granitoid gneiss with admixtures of schist.
Upland slopes and ridges	Good	2 to 60	Residuum from gneiss mixed in places with residuum from schist, granite, quartzite, and basic rock.
Upland slopes and ridges	Good	15 to 90	Residuum from basic rock, chiefly hornblende schist and diorite.
Upland slopes and ridges	Good	2 to 60	Residuum from quartzite and quartzitic gneiss, granite, and schist.
Upland slopes and ridges	Good	2 to 60	Residuum from mica schist and quartz mica schist.
Upland slopes and ridges	Good	2 to 60	Residuum from quartz mica schist and mica schist with admixtures of gneiss.
High stream terraces	Moderately good	2 to 10	Old general alluvium.
Stream terraces	Good	2 to 10	Old general alluvium.
Upland slopes and ridges	Good	2 to 15	Residuum from mixed acidic and basic rock, chiefly gneiss with mixtures of schist, diorite, and hornblende.
Low stream terraces	Somewhat poor	0 to 6	General alluvium.
Low upland areas and at the base of slopes.	Somewhat poor	2 to 10	Weathered material from light-colored granite and gneiss.
Upland slopes and ridges	Good	15 to 60	Residuum from mica schist with admixtures of gneiss.
Draws and at the base of slopes	Moderately good to good.	2 to 15	Local alluvium and colluvium.
Mountainous slopes and ridges	Good to somewhat excessive.	10 to 95	Residuum from granite and gneiss.
Upland slopes and ridges	Good	10 to 90	Residuum from dark-colored basic rock, chiefly hornblende and diorite.
High stream terraces	Good	2 to 15	Mixed acidic and basic old general alluvium.
Upland slopes and ridges	Good	10 to 25	Residuum from basic or mixed acidic and basic materials, chiefly diorite, schist, and hornblende with mixtures of quartzite and gneiss.

Soils

Slight depressions and on the lowest parts of low stream terraces.	Poor	0 to 2	General alluvium.
Flood plains	Poor	0 to 2	Recent general alluvium.

TABLE 8.—*Classification of the soil*

AZONAL

Great soil group and soil series	Brief profile description [1]
Lithosols:	
1. With some characteristics of Red-Yellow Podzolic soils:	
Ashe	Grayish-brown stony loam over olive-gray fine sandy loam; underlain by pale-yellow and white, soft gneissic rock that crumbles with slight pressure.
Chandler	Olive to yellowish-brown loam over dark yellowish-brown, loamy saprolite of mica schist, grading at a variable depth to horizontal beds of mica schist.
Louisa	Dark-gray to dark yellowish-brown fine sandy loam over yellowish-brown heavy sandy loam, containing pockets of yellowish-red clay loam and grading at a variable depth to partly weathered mica schist.
Louisburg	Dark grayish-brown sandy loam over yellowish-brown to light yellowish-brown sandy loam, grading at a variable depth to hard rock.
Alluvial soils: [2]	
1. Representative:	
Buncombe	Light-brown loamy sand over yellowish-brown to gray loamy sand
Chewacla	Dark-brown to yellowish-brown silt loam to very fine sandy loam over mottled silt loam
Congaree	Dark-brown silt loam over dark-brown sandier material below 30 inches

[1] These descriptions are of soil profiles not greatly affected by accelerated erosion. The most common colors and textures are given.

Red-Yellow Podzolic soils

The soils of the Red-Yellow Podzolic great soil group are in the zonal order. They are well developed and well drained to moderately well drained. They have thin, organic and organic-mineral horizons over a yellowish-red to yellowish-brown leached horizon. The leached horizon overlies an alluvial, red or yellowish-brown horizon. These soils have developed under a deciduous or mixed forest in a warm-temperate, moist climate and are strongly acid. The yellowish-brown soils of this great soil group probably have developed under a less luxuriant ground cover than have the reddish soils. Laterization and podzolization are the chief processes in the development of Red-Yellow Podzolic soils.

Apparently these soils have developed under similar climate and vegetation. Although they differ somewhat in their degree of maturity, they are old enough to have a moderately well-developed profile. They range from level to steep, but differences in slope probably are not the primary cause of differences in the profile. Many differences in the profile are mainly the result of differences in parent materials. In this county the parent materials vary from quartzite to gneiss and schist. The yellowish-red soils, which are less well drained than the red soils, normally developed from parent material that is lower in bases than that of the red soils.

Altavista series.—This series consists of nearly level and gently sloping, moderately well drained soils that have developed in old alluvium on low stream terraces. These soils are yellower throughout the profile than the Wickham soils and are less well drained.

The Altavista soils are well within the range of the Red-Yellow Podzolic soils, but they are mottled below a depth of about 22 inches.

Profile of Altavista fine sandy loam 2 to 6 percent slopes (on a connecting road 0.6 mile west of Antioch Baptist Church, in a field near a small stream)—

A_{00} and A_0 1 inch to 0, leaves and twigs combined with some decaying organic matter and humus; very strongly acid; about 1 inch thick.

A_1 0 to 4 inches, light olive-brown (2.5Y 5/4) fine sandy loam; weak, coarse, granular structure; very friable; many fine roots and pores; common, medium and distinct, dark grayish-brown stains of organic matter; low content of organic matter; rapid permeability; strongly acid; boundary clear and smooth; 3 to 6 inches thick.

A_2 4 to 9 inches, brownish-yellow (10YR 6/6) fine sandy loam; weak, medium and coarse, subangular blocky structure; friable to very friable; many fine roots and pores; moderately rapid permeability; strongly acid; boundary gradual and smooth; 4 to 6 inches thick.

B_2 9 to 22 inches, yellow (10YR 7/8) clay loam; moderate, medium and fine, subangular blocky structure; friable; few fine roots; many pores; few very fine mica flakes; moderate permeability; strongly acid; boundary gradual and smooth; 12 to 15 inches thick.

B_3 22 to 32 inches, yellow (10YR 7/8) clay loam with common, medium, distinct, pale-yellow (5Y 7/4) mottles; moderate, medium, subangular blocky structure; friable; few fine roots and pores; few mica flakes; moderate permeability; strongly acid; boundary gradual and smooth; 9 to 12 inches thick.

C 32 to 36 inches +, yellow (10YR 7/8) clay loam with few, fine, prominent, yellowish-red (5YR 5/8) and white (N 8/0) mottles; weak, medium and coarse, subangular blocky structure; very friable to friable; no fine roots; few medium-sized mica flakes; moderately slow permeability; strongly acid; more than 4 inches thick.

The surface soil ranges from light grayish brown to brown. The subsoil ranges from light red to yellow and is mottled with pale yellow or gray. The parent material

series by higher categories—Continued

SOILS

Topographic position	Soil drainage	Slope range	Parent material
		Percent	
Steeper mountain slopes	Somewhat excessive	15 to 95	Residuum from light-colored granite and gneiss, and mixtures of schist.
Mountainous ridges, knobs, and steep slopes.	Somewhat excessive	15 to 95	Residuum from mica schist and phyllite.
Upland ridges and slopes	Somewhat excessive	15 to 90	Residuum from mica schist, talcose schist, and highly micaceous gneiss.
Upland slopes and ridges	Good to somewhat excessive.	10 to 60	Residuum from light-colored granite, gneiss, and quartzitic material.
Flood plains	Somewhat excessive	0 to 6	Recent general alluvium.
Flood plains	Somewhat poor	0 to 2	Recent general alluvium.
Flood plains and at the head of draws.	Good	0 to 6	Recent general alluvium and recent local alluvium.

[2] Alluvial land and Alluvial land, wet, are also included in this great soil group.

extends to a depth of 30 inches or more and overlies material unrelated to that above it.

Appling series.—This series consists of gently sloping and sloping, well-drained soils that have developed in residuum from aplitic and granitoid gneisses mixed with schist. These soils are less red in the B horizon than are the Cecil soils and are mottled higher up in the profile.

Profile of Appling sandy loam, 2 to 6 percent slopes, eroded (on State Route 115, 0.6 mile west of its junction with U.S. Highway No. 123)—

A_p 0 to 9 inches, yellowish-brown (10YR 5/4) sandy loam; weak, fine, granular structure; very friable; many fine roots and pores; low content of organic matter; moderately rapid permeability; strongly acid; boundary clear and smooth; about 8 to 12 inches thick.

B_1 9 to 15 inches, yellowish-red (5YR 5/6) sandy clay loam; moderate, fine and medium, subangular blocky structure; friable; many fine roots and pores; moderate permeability; strongly acid; boundary gradual and wavy; 5 to 8 inches thick.

B_2 15 to 26 inches, reddish-brown (5YR 5/4) sandy clay; moderate, fine, subangular blocky structure; friable; few fine roots and pores; moderately slow permeability; strongly acid; boundary gradual and wavy; 10 to 13 inches thick.

B_3 26 to 33 inches, reddish-brown (5YR 5/4) sandy clay loam with common, fine, distinct, reddish-yellow (7.5YR 6/6) mottles; moderate, medium and fine, subangular blocky structure; friable to very friable; few large roots; moderately slow permeability; strongly acid; boundary clear and wavy; 6 to 10 inches thick.

C 33 to 40 inches +, brownish-yellow (10YR 6/6) disintegrated material of sandy loam texture; common, medium, prominent, reddish-brown (5YR 5/4) and yellowish-red (5YR 4/8) mottles; subangular blocky structure; friable; strongly acid; no fine roots; more then 7 inches thick.

The A_p horizon, or the A_2 if it is present, ranges from yellow to yellowish brown. The B horizon is yellowish brown to yellowish red and reddish brown, and it is mottled in the lower part. This soil is underlain by saprolite at a depth of 3 to 4½ feet. The saprolite is soft or decomposed rock that has not been affected much by growing organisms.

Cecil series.—This series consists of gently sloping to steep, well-drained soils. These soils have developed in residuum from gneiss that is mixed in places with residuum from schist, granite, quartzite, and basic rock. The Cecil soils are good examples of Red-Yellow Podzolic soils that have a thick, red (hue, 2.5YR; chroma, 6 or more) subsoil with moderate, fine and medium, angular blocky structure.

Profile of Cecil sandy loam, 2 to 6 percent slopes (on east side of State Route 197, 0.9 mile north of its junction with U.S. Highway No. 123)—

A_p 0 to 12 inches, reddish-brown (5YR 4/3) sandy loam; weak, fine, granular structure; very friable; many roots and pores; low content of organic matter; rapid permeability; strongly acid; boundary gradual and smooth; 6 to 12 inches thick.

A_2 12 to 16 inches, reddish-brown (5YR 4/4) sandy loam; weak, medium and coarse, granular structure; friable; many roots and pores; moderately rapid permeability; strongly acid; boundary clear and smooth; 3 to 8 inches thick.

B_1 16 to 20 inches, red (2.5YR 4/6) sandy clay loam; moderate, fine and medium, angular blocky structure; friable; few fine roots and pores; many very fine mica flakes; moderately rapid permeability; strongly acid; boundary gradual and wavy; 3 to 8 inches thick.

B_2 20 to 27 inches, red (2.5YR 4/6) clay loam; moderate, fine, angular blocky structure; firm; few fine roots and pores; many very fine mica flakes; moderate permeability; strongly acid; boundary gradual and wavy, 6 to 8 inches thick.

B_3 27 to 36 inches, red (2.5YR 4/8) sandy clay loam; moderate, medium and fine, angular blocky structure.

firm; few fine roots; intrusion of mica gneiss; moderate permeability; boundary diffuse and irregular; 6 to 12 inches thick.

C 36 to 48 inches, red (2.5YR 4/8) sandy clay loam; moderate, medium, massive rock; hard, but friable after crushing; strongly acid; more than 12 inches thick.

The A_p horizon ranges from yellowish brown to yellowish red and reddish brown in color and from sandy loam and stony sandy loam to sandy clay loam in texture. Severely eroded areas have a red sandy clay loam surface soil. The color of the B horizon varies from place to place. It approaches dark red in areas of basic materials and is paler red and contains much coarser sand in areas of quartzitic materials. The soil horizons are generally thinner and less strongly developed on steep slopes than on mild ones. In most places, the parent rock in the steeper, northern part of the county has been highly metamorphosed and is finer grained than elsewhere. In this part of the county the depth to bedrock ranges from 4 to 7 feet.

Clifton series.—This series consists of moderately steep to very steep, well-drained soils that have developed in residuum from basic rock, mainly hornblende schist and diorite. These are Red-Yellow Podzolic soils that have a moderately thick B_2 horizon of yellowish-red clay (hue, 5 YR; chroma 8). The A horizon is darker colored than that of the Cecil soils, and the B_2 horizon is less red, thinner, and more plastic. The structure is less well developed than that in the Cecil soils, and the C horizon is much more rocky and closer to the surface. All of the Clifton soils that were mapped in Habersham County are in the Clifton-Davidson complex or the Clifton-Davidson stony complex. The Clifton soils are shallower and less red than the Davidson soils.

Profile of a Clifton soil with a loam surface soil (on the Hunting Club road, about 0.3 mile north of the Soque Hunting Club)—

A_{00} and A_0 1 inch to 0, loose litter and remains of partly decomposed plants (fermentation layer).

A 0 to 4 inches, very dark grayish-brown (10YR 3/2) loam; weak, fine, granular structure; friable; many fine and medium roots; about 2 percent of horizon is rock fragments; moderate permeability; strongly acid; boundary clear and smooth; 3 to 4 inches thick.

B_1 4 to 10 inches, reddish-brown (5YR 4/4) to yellowish-red (5YR 4/6) clay loam; weak, fine, subangular blocky structure; friable; many fine and medium roots; about 2 percent of horizon is rock fragments; moderate permeability; strongly acid; boundary clear and smooth; 5 to 6 inches thick.

B_2 10 to 22 inches, yellowish-red (5YR 4/8) clay; weak, medium, subangular blocky structure; friable; many fine and medium roots; about 10 percent of horizon is rock fragments; moderately slow permeability; strongly acid; boundary abrupt and wavy; 5 to 15 inches thick.

C 22 to 34 inches +, layers of rock of varied size and degree of disintegration separated by undifferentiated soil material.

The surface layer of the Clifton soils ranges from loam to stony loam.

Profile of a Clifton soil with a stony loam surface soil (½ mile north of the Soque Hunting Club on the Hunting Club road)—

A_{00} and A_0 1 inch to 0, loose litter (fermentation layer).

A_1 0 to 3 inches, dark yellowish-brown (10YR 4/4) stony loam; weak, fine, granular structure; friable; many fine and medium roots; about 5 percent of horizon is rock fragments; moderate permeability; strongly acid; boundary abrupt and smooth; 2 to 4 inches thick.

B 3 to 7 inches, dark-brown and brown (7.5YR (4/4) clay loam; moderate, fine, granular structure; friable; many fine and medium roots; about 10 percent of horizon is rock fragments; strongly acid; boundary abrupt and smooth; 3 to 6 inches thick.

BC 7 to 36 inches, strong-brown (7.5YR 5/6) heavy clay loam between rocks 4 to 24 inches in diameter; rocks make up 70 percent of horizon; roots penetrate as much as 3 feet in the soil material between the rocks.

The B horizon ranges from yellowish red to strong brown. The thickness of the solum ranges from a few inches to 3 feet, depending on the amount of stones present.

Habersham series.—The Habersham series consists of gently sloping to strongly sloping, well-drained soils that have developed in residuum from quartzite and quartzitic gneiss, granite, and schist. These soils have a coarser textured, paler colored, and less well developed B horizon than have the Cecil soils.

Profile of Habersham fine sandy loam, 6 to 10 percent slopes (near Turnerville, 0.2 mile down a farm road, 5.6 miles north of the junction of State Route 11 and U.S. Highway No. 441)—

A_1 0 to 4 inches, yellowish-brown (10YR 5/6) fine sandy loam; weak, fine, granular structure; very friable; many fine roots and pores; low content of organic matter, moderately rapid permeability; strongly acid; boundary diffuse and smooth; 2 to 4 inches thick.

A_2 4 to 10 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; moderately rapid permeability; strongly acid; boundary diffuse and smooth; 5 to 7 inches thick.

B_1 10 to 16 inches, brown (7.5YR 5/4) fine sandy loam; weak, medium, subangular blocky structure; friable; few fine roots; moderately rapid permeability; strongly acid; boundary diffuse and smooth; 5 to 7 inches thick.

B_2 16 to 21 inches, strong-brown (7.5YR 5/6) fine sandy loam; weak, fine and medium, angular blocky structure; friable; few fine roots; moderately rapid permeability; strongly acid; boundary diffuse and wavy; 4 to 7 inches thick.

B_3 21 to 28 inches, yellowish-red (5YR 5/6) sandy clay loam; moderate, medium, angular blocky structure; very friable; few fine roots; rapid permeability; boundary clear and broken; 5 to 10 inches thick.

C 28 to 64 inches, yellowish-red (5YR 5/6), weathered material, derived from quartzitic material containing some fine mica flakes.

D_r 64 inches +, pink, yellow, and gray bedrock; hard; many fractures.

The subsoil ranges from strong brown to yellowish red and red.

Halewood series.—This series consists of gently sloping to steep, well-drained soils that have developed in residuum from mica schist and quartz mica schist. The B_2 horizon of these soils is less reddish than that of the Cecil and the Madison soils, and mica flakes are common throughout the profile, as they are in the Madison soils. The B horizon of the Halewood soils ranges from 5YR to 10YR in hue, whereas that of the Cecil and Madison soils commonly has a hue of 2.5YR.

Profile of Halewood fine sandy loam, 10 to 15 percent slopes (0.5 mile southeast of the water pumping station on Little Panther Creek)—

A_{00} 2 inches to 1 inch, hardwood leaves and litter.

A_0 1 inch to 0, decaying organic matter and humus.

A_1 0 to 1 inch, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, coarse and medium, granular structure; very friable; many pores; many fine and medium

roots; moderately rapid permeability; strongly acid; boundary abrupt and smooth; about 1 inch thick.

A_2 1 to 6 inches, yellowish-brown (10YR 5/6) fine sandy loam; weak, coarse and medium, granular structure; very friable; many pores; many fine and medium roots; low content of humus; moderately rapid permeability; strongly acid; boundary clear and smooth; 4 to 6 inches thick.

B_1 6 to 11 inches, strong-brown (7.5YR 5/6) fine sandy loam; weak, coarse and medium, angular blocky structure; very friable; many fine roots; strongly acid; boundary clear and smooth; about 4 to 6 inches thick.

B_{21} 11 to 15 inches, yellowish-red (5YR 5/6) fine sandy clay loam; weak, coarse and medium, angular blocky structure; very friable; few fine roots; some quartzitic gravel; moderate permeability; strongly acid; boundary gradual and smooth; 4 to 5 inches thick.

B_{22} 15 to 27 inches, yellowish-red (5YR 5/6) clay loam; weak, medium and coarse, angular blocky structure; very friable; few fine roots; few fine mica flakes; few large root holes; moderate permeability; strongly acid; boundary diffuse and smooth; 10 to 14 inches thick.

B_3 27 to 37 inches, yellowish-red (5YR 5/6) fine sandy clay loam; weak, medium and coarse, angular blocky structure; very friable; common very fine mica flakes; moderate permeability; strongly acid; boundary diffuse and smooth; 8 to 14 inches thick.

C 37 to 63 inches, yellowish-red (5YR 5/6) gneissic saprolite with common, fine and medium, very faint, red and reddish-yellow mottles; material is soft, easily crushed to loam; contains common very fine mica flakes.

The thickness of the solum ranges from 24 to 72 inches. Mica flakes may be numerous in the lower part of the profile. Where it is thinner than normal, the B horizon ranges from yellowish red to yellowish brown. A few angular quartzitic fragments may occur on the surface and in the profile.

Madison series.—This series consists of gently sloping to steep, well-drained soils that have developed in residuum from quartz mica schist and mica schist with admixtures of gneiss. The Madison soils are representative Red-Yellow Podzolic soils that have a thick, red (hue, 2.5YR; chroma, 6 or more) subsoil with moderate, fine and medium, angular blocky structure. The Madison soils are much more micaceous, especially in the B and C horizons, than are the Cecil soils.

Profile of Madison fine sandy loam, 6 to 10 percent slopes (on a paved side road, 132 feet off State Route 197, 2 miles north of junction of State Route 197 and U.S. Highway No. 123)—

A_p 0 to 4 inches, reddish-brown (5YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; many fine roots and pores; many fine quartz pebbles; no mica flakes; low content of organic matter; moderately rapid permeability; boundary clear and smooth; 3 to 6 inches thick.

B_1 4 to 7 inches, red (2.5YR 4/6) sandy clay loam; moderate, fine and medium, angular blocky structure; friable; many fine roots and pores; few mica flakes; moderate permeability; strongly acid; boundary clear and smooth; 2 to 4 inches thick.

B_2 7 to 16 inches, red (2.5YR 4/8) clay loam; moderate, fine, angular blocky structure; firm; few fine roots and pores; many small mica flakes; moderate permeability; strongly acid; boundary gradual and wavy; 8 to 10 inches thick.

B_3 16 to 31 inches, red (2.5YR 4/6) clay loam; moderate, fine and medium, angular blocky structure; firm to friable; few fine roots; many small mica flakes; moderate permeability; strongly acid; boundary gradual and irregular; 12 to 18 inches thick.

C 31 to 67 inches, red (2.5YR 4/6), weak-red (2.5YR 5/2), and reddish-brown (2.5YR 5/4), weathered, soft mica schist; 36 inches or more thick.

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The depth of this soil ranges from 23 to 36 inches. The A horizon ranges from reddish brown to yellowish red but is of fairly constant thickness. On steep slopes the B horizon is thinner than that described. In local areas where soil development has been affected by basic material, the subsoil ranges from nearly yellowish red and red to dark red.

Masada series.—This series consists of gently sloping and sloping, moderately well drained soils that have developed in old alluvium on high terraces. The soils are the intermediate members of the Hiwassee-Masada-Augusta catena. The B horizon of Masada soils is strong brown to yellowish brown (hues, 7.5YR and 10YR), whereas that of Hiwassee soils is dark red (hue, 2.5YR) and that of Augusta soils is prominently mottled, light olive brown (hue, 2.5Y) over light gray.

Profile of Masada fine sandy loam, 2 to 6 percent slopes, eroded (on a dirt road, ½ mile south of State Route 115, 1.2 miles west of the junction of State Route 115 and U.S. Highway No. 123)—

A_p 0 to 8 inches, grayish-brown (10YR 5/2) fine sandy loam; weak, medium, granular structure; very friable; many fine roots and pores; small pebbles; rapid permeability; strongly acid; boundary gradual and wavy; 5 to 9 inches thick.

A_1 8 to 14 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, coarse, granular structure; very friable; many fine roots and pores; small pebbles; moderately rapid permeability; strongly acid; boundary clear and smooth; 4 to 8 inches thick.

A_2 14 to 22 inches, light olive-brown (2.5Y 5/4) fine sandy loam; weak, medium and coarse, granular structure; very friable; many fine roots and pores; moderately rapid permeability; strongly acid; boundary gradual and wavy; 4 to 9 inches thick.

B_1 22 to 27 inches, yellowish-brown (10YR 5/6) fine sandy clay loam; moderate, fine and medium, angular blocky structure; friable; many fine roots and pores; moderate permeability; strongly acid; boundary gradual and wavy; 3 to 7 inches thick.

B_2 27 to 36 inches, strong-brown (7.5YR 5/8) sandy clay loam; moderate, fine, angular blocky structure; friable to firm; few fine roots and pores; moderate permeability; strongly acid; boundary gradual and wavy; 7 to 18 inches thick.

B_3 36 to 47 inches, strong-brown (7.5YR 5/8) sandy loam with common, medium, prominent, red (2.5YR 5/8) mottles; weak, medium and coarse, angular blocky structure; friable; few fine roots; 2 percent of horizon is water-rounded quartz gravel; slow to moderately slow permeability; strongly acid; boundary clear and wavy; 9 to 15 inches thick.

C 47 to 64 inches, brownish-yellow (10YR 6/8) sandy loam with common, medium, prominent, red (2.5YR 5/8) mottles; weak, coarse, angular blocky structure; friable; few fine roots; 30 percent of horizon is water-rounded gravel; boundary clear and wavy; 9 to 20 inches thick.

D 64 to 73 inches +, yellow (10YR 7/8), residual material of loam texture; many, coarse, prominent, reddish-yellow (5YR 6/8) mottles; massive; very friable; more than 11 inches thick.

The solum ranges from 30 to more than 60 inches in thickness. Masada soils generally have a deeper A_1 horizon than do other soils in the county. The subsoil ranges from yellowish red through light brown to strong brown, and the lower part of the B horizon is mottled with yellowish red and light red.

Wickham series.—This series consists of gently sloping and sloping, well-drained soils that have developed in old alluvium on stream terraces. These soils are represent-

ative of the Red-Yellow Podzolic great soil group. They have a moderately thick, reddish-yellow to yellowish-red (hue, 5YR; chroma, 6 or more) subsoil of moderate, fine and medium, angular blocky structure. Wickham soils are more friable throughout the profile than the Cecil soils and are more open and porous in the substratum. Their subsoil contains more sand than that of the Cecil soils.

Profile of Wickham fine sandy loam, 2 to 6 percent slopes, eroded (⅝ mile east of the bridge and 1¾ miles northeast of Bethlehem Baptist Church)—

A_p 0 to 8 inches, dark grayish-brown (2.5Y 4/2) fine sandy loam; weak, medium, granular structure; very friable; many fine roots and pores; moderately rapid permeability; strongly acid; boundary abrupt and smooth.

B_1 8 to 14 inches, strong-brown (7.5YR 5/6) sandy clay loam; moderate, medium, subangular blocky structure; friable; many fine roots and pores; moderate permeability; strongly acid; boundary gradual and smooth.

B_2 14 to 22 inches, yellowish-red (5YR 5/6) sandy clay; moderate, fine and medium, angular blocky structure; firm; few fine roots; permeability moderately slow; strongly acid; boundary gradual and smooth.

B_3 22 to 28 inches, reddish-yellow (5YR 6/8) sandy clay loam; moderate, medium, angular blocky structure; friable to firm; few fine roots; few mica flakes; moderately slow permeability; strongly acid; boundary gradual and smooth.

C 28 to 36 inches +, brownish-yellow (10YR 6/6) sandy loam with common, medium and fine, very pale brown (10YR 7/4) mottles; structureless; very friable; strongly acid; many mica flakes.

The subsoil is brown, reddish yellow, and red. The solum ranges from 22 to more than 36 inches in thickness but is about 28 inches thick in most places. The alluvial deposit is several feet thick in some places.

Lloyd series.—This series consists of gently sloping to strongly sloping, well-drained soils. These soils have developed in residuum from mixed acid and basic rock, chiefly gneiss and mixtures of schist, diorite, and hornblende. Their subsoil is darker red than that of the Cecil soils, and their profile generally is not so dark colored as that of the Davidson soils.

The Lloyd soils have some characteristics of the Red-Yellow Podzolic soils and some of those of the Reddish-Brown Lateritic soils.

Profile of Lloyd loam, 10 to 15 percent slopes, eroded (near Camp Creek Church)—

A_p 0 to 4 inches, dark-red (2.5YR 3/6) loam; weak, very fine, granular structure; friable; many fine roots and pores; moderately rapid to moderate permeability; strongly acid; boundary diffuse and smooth; 3 to 5 inches thick.

AB 4 to 8 inches, dark-red (2.5YR 3/6) sandy clay loam; weak, medium, subangular blocky structure; friable; many fine roots and pores; moderate permeability; strongly acid; boundary diffuse and smooth; 3 to 6 inches thick.

B_1 8 to 12 inches, dark-red (2.5YR 3/6) sandy clay loam; moderate, fine, angular blocky structure; firm; few fine roots and pores; moderately slow permeability; strongly acid; boundary clear and wavy; 3 to 8 inches thick.

B_2 12 to 17 inches, red (10R 4/6) clay; moderate, fine, angular blocky structure; firm; few fine roots; moderately slow permeability; strongly acid; boundary diffuse and wavy; 4 to 8 inches thick.

B_3 17 to 30 inches, dark-red (10R 3/6) clay; moderate, medium and fine, angular blocky structure; firm; few fine roots; moderately slow permeability; boundary diffuse and wavy; 8 to 12 inches thick.

C 30 to 60 inches, red (10R 4/6), firm material of variegated weathered schist and gneiss; no fine roots; strongly acid; intrusions of basic material.

The surface soil ranges from reddish brown to dark reddish brown, and the subsoil, from red to dark red. Intrusions of basic material occur in the C horizon in some places. Lloyd soils are 4 to 5 feet thick in most places, but their thickness over parent rock ranges from 26 inches to 6 feet or more. They are very micaceous in places. Where they occur next to the Madison soils, Lloyd soils are darker and deeper than those soils.

Augusta series.—This series consists of nearly level and gently sloping, somewhat poorly drained soils that have developed in alluvium on low stream terraces. These soils commonly have a light olive-brown, prominently mottled B horizon that is underlain by light-gray material. In contrast, the moderately well drained Altavista soils have a yellow to brownish-yellow B horizon, and the well-drained Wickham soils have a red B horizon.

The Augusta soils are Red-Yellow Podzolic soils, but they are somewhat poorly drained, are mottled, and have a light-gray C horizon. Consequently, they have some of the characteristics of Low-Humic Gley soils.

Profile of Augusta silt loam, 0 to 2 percent slopes (on State Route 115, 2⅖ miles east of Clarkesville city limits, on north side of road and 3,000 feet down a draw)—

A 0 to 2 inches, dark grayish-brown (2.5Y 4/2) silt loam; weak, fine, granular structure; very friable; many fine roots and pores; very fine mica flakes; moderate permeability; strongly acid; boundary clear and smooth; 2 to 6 inches thick.

B_2 2 to 15 inches, light olive-brown (2.5Y 5/4) silt loam with common, medium, prominent, yellowish-red (5YR 5/8) mottles; weak, fine, subangular blocky structure; friable; many fine roots and pores; very fine mica flakes; moderately slow to slow permeability; very strongly acid; boundary gradual and smooth; 6 to 15 inches thick.

B_3 15 to 20 inches, light olive-brown (2.5Y 5/4) silt loam with common, medium, prominent, yellowish-red (5YR 5/8), and light brownish-gray (2.5Y 6/2) mottles; weak, fine, subangular blocky structure; firm; few fine roots; very fine mica flakes; slow permeability; very strongly acid; boundary gradual and smooth; 3 to 8 inches thick.

C_g 20 to 36 inches, light-gray (5Y 7/1) silt loam with common, medium, prominent, yellowish-red (5YR 5/8) mottles; weak, fine subangular blocky structure; friable; no fine roots; many fine mica flakes; slow permeability; very strongly acid; more than 16 inches thick.

Augusta soils formed in irregularly stratified sediments. In places the B and C horizons are grayer than in the profile described. In some places drainage is almost poor. In most places mottling begins at a depth of about 8 inches. The surface soil is light grayish brown to dark gray. The content of mica varies considerably.

Colfax series.—The Colfax series consists of gently sloping and sloping, somewhat poorly drained soils. These soils have formed on low uplands and at the base of slopes in materials weathered from light-colored granite and gneiss. The soils are distinctly mottled below a depth of about 7 inches and are distinctly to prominently mottled below a depth of about 22 inches.

Although they are in the Red-Yellow Podzolic great soil group, the Colfax soils are somewhat poorly drained, are mottled, and have some of the characteristics of Low-Humic Gley soils.

Profile of Colfax sandy loam, 6 to 10 percent slopes, eroded (on a dirt road south of State Route 115, 1.2 miles west of its junction with U.S. Highway No. 123)—

- A_o 2 inches to 0, dark-gray (N 4/0), decomposed roots and leaves; boundary abrupt and smooth; about 2 inches thick.
- A_p 0 to 3 inches, grayish-brown (2.5Y 5/2) sandy loam with common, medium, distinct, brownish-yellow (10YR 6/8) mottles; weak, medium, granular structure; very friable; many fine roots; moderately rapid permeability; strongly acid; boundary clear and smooth; 2 to 3 inches thick.
- B_1 3 to 7 inches, yellowish-brown (10YR 5/6) sandy clay with common, medium, faint, yellow (10YR 7/6) mottles; moderate, medium and coarse, subangular blocky structure; friable; many fine roots; slow permeability; strongly acid; boundary gradual and smooth; 3 to 6 inches thick.
- B_2 7 to 15 inches, yellowish-brown (10YR 5/6) sandy clay with common, medium, distinct, reddish-yellow (7.5YR 7/8) mottles; moderate, fine and medium, subangular blocky structure; firm; few fine roots; slow permeability; strongly acid; boundary gradual and wavy; 6 to 10 inches thick.
- B_3 15 to 22 inches, brownish-yellow (10YR 6/8) sandy clay with common, medium, distinct, pale-yellow (2.5Y 7/4) mottles; moderate, medium, angular blocky structure; friable; few fine roots; slow permeability; strongly acid; boundary gradual and irregular; 0 to 12 inches thick.
- C 22 to 62 inches +, brownish-yellow (10YR 6/8) sandy clay with many, coarse, distinct, pale-yellow (2.5Y 8/4) and common, medium, prominent, reddish-yellow (5YR 6/8) mottles; massive; few fine roots; decomposed granite and gneiss; more than 40 inches thick.

In some places the surface soil is as light in color as that of the Appling soils, but mottles are much nearer the surface in the Colfax. Some areas have a thin overburden of transported material. In some places the B_3 horizon is not present.

Gray-Brown Podzolic soils

The Gray-Brown Podzolic soils are in the zonal order. They have a thin organic-mineral layer that overlies an acid, grayish-brown, leached layer. The leached layer overlies an illuvial reddish-brown or grayish-brown horizon. These soils have developed under a deciduous or mixed forest in a warm-temperate, moist climate and are strongly acid.

Watauga series.—This series consists of moderately steep, well-drained soils that have developed in residuum from mica schist with admixtures of gneiss. These soils occur with the Chandler soils but have a thicker, more developed B horizon than those soils. Their parent material is similar to that of the Madison soils, but their profile, especially the B horizon, is much paler.

In this county the Watauga are the soils most representative of the Gray-Brown Podzolic great soil group.

Profile of Watauga loam, 15 to 25 percent slopes (⅝ mile southeast of Community Baptist Church)—

- A_1 0 to 2 inches, olive (5Y 5/4) loam; very weak, very fine, granular structure to structureless; loose when dry; many fine roots; very few mica flakes; rapid permeability; strongly acid; boundary clear and smooth; 0 to 3 inches thick.
- A_2 2 to 9 inches, brownish-yellow (10YR 6/6) loam; weak, coarse to medium, granular structure; very friable; many fine roots; few mica flakes; moderate permeability; strongly acid; boundary gradual and wavy; 4 to 10 inches thick.
- A_3 9 to 11 inches, brownish-yellow (10YR 6/8) loam; weak, coarse to medium, granular structure; very friable; many small and large roots; few mica flakes; moderate permeability; strongly acid; boundary gradual and wavy; 1 to 4 inches thick.
- B_1 11 to 14 inches, yellowish-brown (10YR 5/6) clay loam; moderate, medium, subangular blocky structure; friable; few large roots; many mica flakes; moderate permeability; strongly acid; boundary gradual and wavy; 2 to 6 inches thick.
- B_2 14 to 20 inches, strong-brown (7.5YR 5/6) clay loam; moderate, medium, subangular blocky structure; firm; few large roots; many mica flakes; slow permeability; strongly acid; boundary clear and smooth; 4 to 8 inches thick.
- C 20 to 25 inches, yellowish-red (5YR 5/8) clay loam; weak, medium and fine, subangular blocky structure; friable; few large roots; 50 percent mica flakes; slow permeability; strongly acid; boundary abrupt and smooth; 3 to 8 inches thick.
- D 25 to 33 inches +, red (2.5 YR 4/8) mica schist.

The amount of mica and of quartz fragments varies from place to place, and the profile varies in thickness.

Tusquitee series.—This series consists of gently sloping to strongly sloping, deep, moderately well drained to well drained soils. These soils have developed in local alluvium and colluvium in draws and at the base of slopes. They are Gray-Brown Podzolic soils. Structure, however, in the B horizon is not strongly expressed.

The stony Tusquitee soils are genetically younger than the nonstony ones and have weaker profile development.

Profile of Tusquitee loam, 6 to 10 percent slopes (on Little Panther Creek, 2/5 mile east of the pumping station)—

- A_{00} 2 inches to 1 inch loose leaves.
- A_0 1 inch to 0, partly decomposed litter and humus.
- A 0 to 9 inches, very dark grayish-brown (2.5Y 3/2) loam; weak, fine, granular structure; very friable; strongly acid; many fine roots and pores; few mica flakes; boundary clear and smooth; 6 to 12 inches thick.
- B_1 9 to 13 inches, yellowish-brown (10YR 5/6) light clay loam; moderate, fine, subangular blocky structure; friable; many fine roots; strongly acid; boundary gradual and wavy; 2 to 5 inches thick.
- B_2 13 to 26 inches, strong-brown (7.5YR 5/6) clay loam; moderate, fine, subangular blocky structure; friable; many fine roots; strongly acid; boundary gradual and smooth; 10 to 18 inches thick.
- C 26 to 46 inches, yellowish-brown (10YR 5/8) loam; weak, fine, subangular blocky structure; very friable; strongly acid; boundary abrupt and wavy; 10 to 25 inches thick.
- D_r 46 to 60 inches +, yellowish-brown (10YR 5/8) material between beds of gravel; strongly acid.

The lower horizons may be much older than the top horizons. In places the soil material is micaceous and ranges from 2 to several feet in thickness. Color varies according to the color of the parent material and the content of organic matter.

Profile of Tusquitee stony loam, 6 to 10 percent slopes (near Bear Gap in the northeastern part of the county)—

- A_0 1½ inches to 0, partly decomposed leaves and litter.
- A_1 0 to 4 inches, dark yellowish-brown (10YR 4/4) stony loam; weak, fine, granular structure; very friable; many fine roots and pores; moderately rapid permeability; very strongly acid; boundary clear and smooth; 3 to 5 inches thick; the surface area is about 3 percent stone; rocks, 2 to 12 inches in diameter, make up about 20 percent of this horizon.
- AB 4 to 26 inches, yellowish-brown (10YR 5/6) fine sandy loam; weak, fine, granular structure; very friable; many fine roots and pores in the upper part; moderately rapid permeability; very strongly acid; boundary

clear and smooth; 12 to 28 inches thick; rocks, 2 to 12 inches in diameter, make up about 20 percent of this horizon.

C_1 26 to 38 inches +, yellowish-brown (10YR 5/8) fine sandy clay loam; moderate, fine and medium, subangular blocky structure; very friable; few fine roots; moderate to moderately slow permeability; strongly acid; 12 inches or more thick; rocks, 2 to 12 inches in diameter, make up 50 to 60 percent of this horizon.

The soil material is micaceous in places and ranges from 2 to several feet in thickness. Because of the amount of stone on the surface and in the profile, this soil ordinarily cannot be cultivated.

Porters series.—This series consists of strongly sloping to very steep, well-drained to somewhat excessively drained soils that have developed in residuum from granite and gneiss. These soils have a thinner and less developed B horizon than have the Watauga soils and are much less micaceous than those soils. They have a browner and finer textured profile than have the Ashe soils. The B horizon of the Ashe soils is absent or is weakly developed, thin, and discontinuous.

The Porters soils are Gray-Brown Podzolic soils, but they have some characteristics of Lithosols. For example, their B horizon is weakly developed.

Profile of Porters loam, 25 to 60 percent slopes (near Bear Gap in the northeastern part of the county)—

A_{00} 1 to ½ inch, leaves.

A_0 ½ inch to 0, decomposed leaves and roots.

A_1 0 to 3 inches, dark yellowish-brown (10YR 4/4) loam; weak, fine, granular structure; very friable; many fine roots and pores; high in humus; rapid permeability; strongly acid; boundary clear and wavy; 2 to 5 inches thick.

A_2 3 to 6 inches, strong-brown (7.5YR 5/8) loam; weak; fine and medium, granular structure; friable; many fine roots and pores; low content of organic matter; rapid permeability; very strongly acid; boundary clear and wavy; 2 to 7 inches thick.

B 6 to 16 inches, brown to dark-brown (7.5YR 4/4) clay loam; weak, medium, subangular blocky structure; friable; many fine roots; very strongly acid; boundary abrupt and discontinuous; 0 to 24 inches thick.

C 16 to 34 inches +, brown to dark-brown (7.5YR 4/4) loam; structureless; very friable; much mica; bedrock or large boulders at 36 inches.

The A_1 horizon may vary from dark yellowish brown to dark brown and black. The B horizon is missing in some places but, where present, is dark brown to brown and strong brown. It is about 10 inches thick in most places. Over large boulders and other rocks, the C horizon may also be missing. Where they are mapped with the Ashe soils in this county, the Porters soils are shallower than they are in places where mapped separately.

Profile of a Porters stony loam (near Bear Gap)—

A_1 0 to 5 inches, very dark brown (10YR 2/2) stony loam; weak, medium, granular structure; loose to very friable; many fine roots and pores; high in humus; stone particles; rapid permeability; strongly acid; boundary gradual and smooth; 4 to 6 inches thick.

A_{12} 5 to 11 inches dark-brown (10YR 3/3) light clay loam; weak, medium and fine, granular structure; very friable; many fine roots and pores; 5 percent of horizon is stones; low content of organic matter; rapid permeability; strongly acid; boundary clear and smooth; 5 to 8 inches thick.

B 11 to 19 inches, dark reddish-brown (5YR 3/4) light clay loam; weak, medium and fine, subangular blocky structure; very friable; many fine roots and pores; 20 percent of horizon is stone and gravel; strongly acid; boundary gradual and wavy; 6 to 8 inches thick.

C 19 to 36 inches +, brown to dark-brown (7.5YR 4/4) light clay loam; weak, medium and fine, subangular blocky structure; very friable; 20 percent of horizon is stone and gravel; 17 inches or more thick.

In some places, the Porters soils grade toward the Ashe soils in color and texture. Rock outcrops are common, and any horizon may be stony or absent.

Reddish-Brown Lateritic soils

The Reddish-Brown Lateritic soils are in the zonal order. These soils have a dark reddish-brown, granular surface layer and a dark-red to reddish-brown, friable clay B horizon. They formed in red and brown lateritic material, and laterization, with little or no podzolization, has dominated in their development. In laterization, silica moves downward in the soils and the content of alumina and of iron increases; the base-exchange capacity decreases.

The A horizon is dark reddish brown and friable, and the B horizon is dark red and friable. The B horizon is high in iron oxides and low in organic matter and nitrogen. In this respect it is comparable to the B horizon in the Red-Yellow Podzolic soils. The C horizon is reddish brown and friable. In some places it has medium-sized, yellow and gray mottles and a varied amount of gravel.

The Reddish-Brown Lateritic soils have developed from rock materials that, in general, are fairly high in bases and that have been in place for a long time. Their profile is well developed, but the B horizon is indistinct. It is uniformly colored and ranges from red to reddish brown.

Davidson series.—This series consists of strongly sloping to steep, well-drained soils on uplands. These soils have developed in residuum from dark-colored basic rock, chiefly hornblende and diorite. They are deeper than the Musella soils and have a darker red subsoil than that of the Cecil soils.

The Davidson soils have the dark reddish-brown surface soil and the well-developed, dark-red subsoil that are characteristic of Reddish-Brown Lateritic soils. In Habersham County, however, the solum of Davidson soils is thin, and the B horizon is thinner than it is in other counties.

Profile of Davidson loam, thin solum, 15 to 25 percent slopes (on the Hunting Club road, 0.5 mile north of Soque Hunting Club)—

A_0 1 inch to 0, dark reddish-brown (5YR 3/2) structureless material composed of decaying organic matter, humus, and mycelia; strongly acid; boundary abrupt and smooth; 1 inch thick.

A_p 0 to 5 inches, dark reddish-brown (5YR 3/4) loam; weak, coarse, granular structure; very friable; many fine roots and pores; moderate content of organic matter; moderately rapid permeability; strongly acid; boundary clear and wavy; 4 to 6 inches thick.

B_1 5 to 13 inches, dark-red (2.5YR 3/6) clay loam; weak, medium and fine, subangular blocky structure; friable; many fine roots and pores; moderate permeability; strongly acid; boundary gradual and wavy; 6 to 8 inches thick.

B_{21} 13 to 27 inches, dark-red (10R 3/6) clay; moderate, fine and medium, angular blocky structure; firm; few fine roots and pores; moderately slow permeability; strongly acid; boundary gradual and wavy; 7 to 15 inches thick.

B_{22} 27 to 38 inches, reddish-brown (5YR 4/4) clay; moderate, medium and fine, angular blocky structure; firm to

friable; few fine roots and pores; rocks, 1 to 3 inches in diameter, make up about 3 percent of this horizon; moderately slow permeability; strongly acid; boundary gradual and wavy; 10 to 12 inches thick.

C 38 to 70 inches, yellowish-red (5YR 5/8) sandy clay with common, medium, distinct, reddish-yellow (7.5YR 6/8) and white (N 8/0) mottles; massive; friable material derived from basic igneous rocks; veins of white quartz; strongly acid; boundary clear and wavy; 26 to 36 inches thick.

D 70 to 88 inches +, strong-brown (7.5YR 5/8), soft basic rock with few white (N 8/0) mottles and veins of white quartz; 18 inches or more thick.

This soil varies mainly in the thickness of its solum. The subsoil ranges from 15 to 35 inches in thickness but is generally about 20 inches thick. In some steep areas bedrock is near the surface.

Profile of a Davidson stony loam (½ mile north of Soque Hunting Club, on the Hunting Club road)—

A_0 2 inches to 0, dark reddish-brown (5YR 3/2) material composed of decaying organic matter, humus, and mycelia; strongly acid; boundary abrupt and smooth; 2 inches to 1 inch thick.

A_1 0 to 5 inches, dark reddish-brown (5YR 3/2) stony loam; weak, coarse, granular structure; very friable; many fine roots and pores; moderately rapid permeability; moderate content of organic matter; strongly acid; boundary clear and wavy; 4 to 7 inches thick.

B_1 5 to 13 inches, reddish-brown (2.5YR 4/4) clay loam; weak, medium, subangular blocky structure; friable; many fine roots and pores; moderate permeability; strongly acid; boundary gradual and wavy; 5 to 10 inches thick.

B_2 13 to 18 inches, reddish-brown (5YR 4/3) clay; moderate, medium, angular blocky structure; friable when moist, slightly plastic when wet; few fine roots and pores; rocks, 2 to 6 inches in diameter, make up about 10 percent of this horizon; moderately slow permiability; strongly acid; boundary diffuse and wavy; 3 to 7 inches thick.

C 18 to 30 inches +, reddish-brown (5YR 5/4) clay loam; many fragments of basic rock; massive; friable; strongly acid; more than 12 inches thick.

The solum is 15 to 30 inches thick over basic rock fragments or over bedrock. In many places stones make up as much as 20 percent of the B horizon.

Hiwassee series.—This series consists of gently sloping to strongly sloping, well-drained, dark-red soils that have developed in mixed acidic and basic old alluvium on high stream terraces. These soils have a darker red B horizon than have the Wickham soils and generally occupy higher terraces and steeper slopes than those soils. They are representative of the Reddish-Brown Lateritic great soil group.

Hiwassee fine sandy loam, 6 to 10 percent slopes, eroded (about 400 feet east of the Cornelia waterworks and filter plant)—

A_p 0 to 4 inches, dark reddish-brown (5YR 3/4) fine sandy loam; strong, fine and medium, granular structure; friable; many fine roots and pores; moderately rapid permeability; strongly acid; boundary clear and smooth; 3 to 6 inches thick.

B_1 4 to 6 inches, dark-red (10R 3/6) clay loam; strong, fine, subangular blocky structure; firm; many fine roots and pores; moderately slow permeability; strongly acid; boundary clear and smooth; 2 to 3 inches thick.

B_{21} 6 to 13 inches, dark-red (10R 3/6) clay; strong, fine, angular blocky structure; firm; compound structure; medium peds break to fine peds; strongly acid; boundary gradual and smooth; 6 to 12 inches thick.

B_{22} 13 to 22 inches, dark-red (2.5YR 3/6) clay; strong, fine and medium, angular blocky structure; firm; few fine roots and pores; moderately slow permeability; strongly acid; boundary gradual and smooth; 6 to 12 inches thick.

B_3 22 to 42 inches, dark-red (2.5YR 3/6) clay; strong, coarse and medium, angular blocky structure; firm; few fine roots; moderately slow permeability; strongly acid; boundary diffuse and smooth; 20 inches or more thick.

C 42 to 59 inches +, dark-red (2.5YR 3/6) clay loam; strong; coarse and medium, angular blocky structure; firm; few fine roots; 17 inches or more thick.

The alluvial deposits range from 28 inches to several feet in thickness and are underlain by residual material. The subsoil is dark red to red. Because of erosion, the surface soil is finer textured and thinner than that in uneroded Hiwassee soils. Many rounded pebbles may be present in the deeper layers of the profile.

Musella series.—This series consists of strongly sloping and moderately steep, shallow, well-drained soils. These soils have developed in residuum from basic or mixed acidic and basic materials, chiefly diorite, schist, and hornblende and, in places, mixtures of quartzite and gneiss. Their B horizon is darker red, thinner, and less well developed than that in the Cecil and Madison soils. They are shallower and have a less well developed profile than the Lloyd and Davidson soils.

The Musella soils are Reddish-Brown Lateritic soils, but their B horizon is thin and incipient and indicates that they have some properties characteristic of Lithosols.

Profile of Musella stony clay loam, 10 to 15 percent slopes, severely eroded (approximately 1,850 feet north of the Cornelia Water Works pumping station)—

A_p 0 to 6 inches, red (2.5YR 4/6) stony clay loam; weak, coarse, granular structure; friable; many fine roots and pores; gravel makes up about 5 percent of the horizon; moderate permeability; strongly acid; boundary clear and wavy; 4 to 7 inches thick.

B 6 to 17 inches, dark-red (2.5YR 3/6) stony clay loam; moderate, medium and fine, subangular blocky structure; friable to firm; many fine roots and pores; moderate permeability; strongly acid; boundary gradual and irregular; 0 to 20 inches thick.

C 17 to 21 inches, red (10R 4/6) and yellowish-red (5YR 5/8) stony clay loam; mottled; massive; friable; few fine roots and pores; horizon discontinuous; boundary clear and irregular; 0 to 30 inches thick.

D_r 21 to 72 inches +, black (N 2/0) and dark-red (10R 3/6), mottled basic rock.

In many places the B horizon is incipient, is only 3 to 4 inches thick, and is about 20 percent gravel. The A horizon and the incipient B horizon combined range from about 4 to 17 inches in thickness but are about 10 inches thick in most places. The C horizon ranges from red to dark reddish brown. In some places the C horizon is in pockets of soil material, but in others it does not occur and the solum is directly over bedrock.

Low-Humic Gley Soils

The Low-Humic Gley soils are in the intrazonal soil order. Less organic material has accumulated in these soils than in the Humic Gleys. Low-Humic Gleys are imperfectly drained to poorly drained. They have a very thin surface horizon that is moderately high in organic matter and is underlain by gleyed mineral horizons. These horizons are mottled gray to brown and have little textural development or differentiation. The soils have developed from poorly drained young alluvium through the process of gleization. They have been saturated with water for long periods in the presence of organic matter.

Most areas of these soils are in the lowest parts of the bottom lands and are likely to be flooded at times.

Roanoke series.—This series consists of level, poorly drained soils that have developed in alluvium in slight depressions and on the lowest parts of stream terraces.

The Roanoke soils are the poorest drained members of the Wickham-Altavista-Augusta-Roanoke catena. They have a compact B horizon, and internal drainage is slow. Consequently, the solum is wet or waterlogged for many months during the cooler parts of the year. These soils are seldom dry except during the driest, hottest periods. They contain little organic matter, except in the upper 1 or 2 inches. The lower part of the profile is gleyed. These soils are representative of the Low-Humic Gley great soil group.

Roanoke fine sandy loam (on Hazel Creek, 0.5 mile east of the bridge near Hazel Creek Baptist Church)—

- A 0 to 1 inch, dark grayish-brown (2.5Y 4/2) fine sandy loam, weak; medium, subangular blocky structure; slightly plastic alluvial material; many fine roots and pores; low content of organic matter; moderately rapid permeability; strongly acid; boundary gradual and smooth; 1 to 5 inches thick.
- B_1 1 to 4 inches, dark grayish-brown (2.5Y 4/2) fine sandy loam with yellowish-red (5YR 5/6) mottles; weak, medium and coarse, angular blocky structure; slightly plastic; many fine roots and pores; slow to moderately slow permeability; strongly acid; boundary gradual and smooth; 3 to 7 inches thick.
- B_2 4 to 9 inches, light olive-brown (2.5Y 5/6) fine sandy clay loam sedimentary material; grayish-brown (2.5Y 5/2) mottles; weak, medium and coarse, angular blocky structure or massive (structureless); slightly plastic; few fine roots; slow permeability; strongly acid; boundary gradual and smooth; 4 to 6 inches thick.
- B_{3g} 9 to 14 inches, light olive-brown (2.5Y 5/6) silty clay loam with common, medium, distinct, grayish-brown (2.5Y 5/2) mottles; weak, coarse, angular blocky structure; slightly plastic; few fine roots; slow permeability; strongly acid; boundary gradual and smooth; 4 to 6 inches thick.
- C_{1g} 14 to 22 inches, light greenish-gray (5GY 7/1) silty clay loam with many, coarse, prominent, olive-yellow (2.5Y 6/6) mottles; weak, coarse, angular blocky structure; slightly plastic; no roots or pores; many mica flakes; slow permeability; strongly acid; boundary gradual and smooth; 6 to 10 inches thick.
- C_{2g} 22 to 36 inches +, light greenish-gray (5GY 7/1) silt loam sedimentary material; common, medium, prominent, yellowish-red (5YR 5/8) mottles; massive (structureless); nonsticky; no roots; contains a layer of small quartz pebbles; slow permeability; strongly acid; more than 14 inches thick.

The A horizon ranges from light grayish brown to dark gray. The substratum is always mottled and poorly drained. The root zone is 6 to 16 inches thick.

Wehadkee series.—This series consists of nearly level, poorly drained soils that have developed in young alluvium on the flood plain of large streams. In this county these soils are covered with an overwash of reddish-brown silt loam that is 4 to 6 inches thick.

Profile of Wehadkee silt loam (about ⅝ mile southeast of the Community Baptist Church)—

- Overwash 0 to 6 inches, reddish-brown (5YR 4/3) silt loam; weak, fine, granular structure; slightly plastic; many fine roots; strongly acid; boundary clear and smooth; 4 to 12 inches thick.
- A 6 to 13 inches, dark grayish-brown (2.5Y 4/2) smooth alluvium of silt loam texture; massive (structureless); slightly plastic; many fine roots; strongly acid; boundary gradual and smooth; 5 to 10 inches thick.
- C_{1g} 13 to 20 inches, dark grayish-brown (2.5Y 4/2) silt loam with common, medium, distinct, yellowish-red (5YR 5/6) mottles; massive (structureless); slightly plastic; few fine roots; strongly acid; boundary gradual and smooth; 6 to 8 inches thick.
- C_{2g} 20 to 27 inches, dark grayish-brown (2.5Y 4/2) sandy clay loam; massive (structureless); nonplastic; few fine roots; mica flakes; some stains of organic matter; strongly acid; boundary gradual and smooth; 6 to 8 inches thick.
- C_{3g} 27 to 36 inches +, very dark gray (N 3/0) silt loam sedimentary deposit; massive (structureless); nonplastic; no roots; strongly acid; more than 9 inches thick.

The A horizon and the C_{1g} horizon vary greatly in thickness. The C_{2g} horizon and the C_{3g} horizon are waterlogged and extremely variable in texture.

Lithosols

The Lithosols great soil group is in the azonal order and is made up of soils that differ little among themselves in profile characteristics, including degree of development. These soils also differ little in topography, stoniness, and drainage. They are normally shallow and occur in rough, hilly, or mountainous areas. In many places they are stony. They commonly are only slightly developed and have no definite profile, but in a few small areas the profile is fairly well developed. In many places the parent material or bedrock is exposed. The native vegetation consists mostly of thin, open stands of hardwood timber.

In this county the soils of the Lithosol great soil group commonly occupy some of the steep slopes in the uplands. Geologic erosion has nearly kept pace with the soil-forming processes. Consequently, the soil profile is less well developed than that of the Red-Yellow Podzolic soils.

Ashe series.—This series consists of moderately steep to very steep, shallow, somewhat excessively drained soils. These soils have developed from light-colored granite and gneiss and, in some places, from mixtures of schist. They occupy the steep mountain slopes. These soils have a weakly developed, weakly colored profile.

Profile of an Ashe stony loam (1 mile south of the Soque Hunting Club on the Clarkesville Road)—

- A_{00} 1½ inches to 1 inch, leaves and twigs.
- A_0 1 inch to 0, grayish-brown (2.5Y 5/2) stony loam; very strongly acid.
- A_1 0 to 4 inches, grayish-brown (10YR 5/2) stony loam; weak, medium and fine, granular structure; very friable; many fine roots and pores; few pebbles; mica flakes; rapid permeability; very strongly acid; boundary clear and wavy; 2 to 5 inches thick.
- A_2 4 to 10 inches, olive-gray (5Y 5/2) fine sandy loam; structureless; very friable to loose; some soft stones; few fine roots; mica flakes; very strongly acid; boundary abrupt and wavy or discontinuous; 4 to 8 inches thick.
- C 10 to 70 inches +, pale-yellow (5Y 8/3) and white (N 8/0), soft gneissic rock that crumbles to fine sandy loam with slight pressure; massive; contains mica flakes and soft granite.

The A_2 horizon is absent in some profiles. The rock in the C horizon is hard in places and crops out on some slope breaks.

Chandler series.—This series consists of moderately steep to very steep, somewhat excessively drained, highly micaceous soils. The soils have developed in residuum from mica schist and phyllite on mountainous ridges, knobs, and steep slopes. They resemble the Louisa soils but have a paler surface soil and a darker colored C hori-

zon. In addition they lack the pockets of yellowish-red clay loam that are characteristic of Louisa soils. They are slightly finer textured than Louisa soils and have less distinct profile development.

Profile of Chandler loam, 25 to 60 percent slopes (1 mile west of Batesville on the Habersham-White county line)—

A 0 to 2 inches, olive (5Y 5/3) loam; weak, fine, granular structure; very friable; many small and medium roots; many fine mica flakes, but does not feel slick; few small micaceous fragments of gneiss; rapid permeability; strongly acid; boundary abrupt and smooth; 1 to 3 inches thick.

BC 2 to 4 inches, yellowish-brown (10YR 5/6) loam; weak, fine, granular structure; very friable; few small rocks of mica gneiss; many roots; many medium and large mica flakes that feel greasy; rapid permeability; strongly acid; boundary abrupt and smooth; 2 to 6 inches thick.

C 4 to 78 inches +, dark yellowish-brown (10YR 4/4), loamy saprolite from mica schist; massive (structureless); veins of quartz and feldspar 2 to 5 inches thick in mica schist; many medium and large mica flakes that feel greasy; few medium and large roots; moderate permeability; medium acid; grades at varied depth to horizontal beds of mica schist.

The C horizon ranges from dark yellowish brown to yellowish red, and the BC horizon, from dark yellowish brown to yellowish red.

Louisa series.—This series consists of moderately steep to very steep, somewhat excessively drained soils that have developed in residuum from mica schist, talcose schist, and gneiss high in mica. This parent material is similar to that of the Madison soils, but the B horizon of the Louisa soils is thinner, less well developed, and less red than that in the Madison soils.

Profile of Louisa fine sandy loam, 15 to 25 percent slopes (on State Highway 197, 1/9 mile southwest of Clarkesville)—

A_{11} 0 to 2 inches, dark-gray (10YR 4/1) fine sandy loam; weak, fine, granular structure; very friable; many small roots; rapid permeability; strongly acid; feels greasy because of mica; small fragments of rock; boundary abrupt and smooth; 1 to 2 inches thick.

A_{12} 2 to 10 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, coarse, granular structure; very friable; many small roots; small fragments of schist; feels greasy because of mica; rapid permeability; strongly acid; boundary gradual and wavy; 6 to 10 inches thick.

BC 10 to 18 inches, yellowish-brown (10YR 5/6) heavy sandy loam with pockets of yellowish-red (5YR 4/8) clay loam; structureless; friable; few fine roots; many mica flakes; moderately rapid permeability; strongly acid; boundary gradual and wavy; 0 to 8 inches thick.

C 18 to 36 inches, partly weathered mica schist.

Variations in this soil occur within short distances. The surface layer ranges from dark yellowish brown to yellowish red in areas underlain by basic schist. An indistinct B horizon, less than 8 inches thick, occurs in places.

In many places the BC horizon is absent or is thinner than that described. Where the BC horizon is absent, the A horizon grades abruptly to a dark yellowish-brown sandy loam C horizon that is 8 to 10 inches thick and contains many fine mica flakes and fine roots. At a depth of about 12 inches, mica schist and other schists occur and are hard to penetrate with an auger.

Louisburg series.—This series consists of strongly sloping to moderately steep, well-drained to somewhat excessively drained soils that have developed in residuum from light-colored granite, gneiss, and quartzitic material. These soils contain much less mica than the Louisa soils. Although the parent material of the Louisburg soils is similar to that of the Cecil and the Appling soils, the B horizon of the Louisburg soils is thin and discontinuous whereas the B horizon of the Cecil and Appling soils is thick, continuous, and well developed.

Profile of Louisburg sandy loam, 15 to 25 percent slopes (near Demorest, ⅛ mile south of the Habersham quarry)—

A_{00} 4 to 2 inches, leaves and twigs; boundary abrupt and smooth; 2 inches thick.

A_0 2 inches to 0, black (N 2/0), decayed leaves, twigs, and roots; boundary clear and smooth; 2 inches thick.

A_1 0 to 3 inches, very dark grayish-brown (10YR 3/2) sandy loam; weak, fine, granular structure; very friable; many fine roots and pores; moderate content of organic matter; rapid permeability; strongly acid; boundary clear and wavy; 2 to 4 inches thick.

A_2 3 to 14 inches, yellowish-brown (10YR 5/4) sandy loam; weak, coarse, subangular blocky structure; very friable; few fine roots and pores; some gravel; moderately rapid permeability; strongly acid; boundary gradual and wavy; 10 to 12 inches thick.

C 14 to 32 inches, light yellowish-brown (10YR 6/4) sandy loam; friable; massive material with small rocks; some mica flakes; strongly acid; boundary abrupt and wavy; 12 to 20 inches thick.

D 32 to 40 inches, hard rock, quartzitic gneiss, and gneiss.

The parent rock may be hard or soft and crops out in many places. The A horizon is dark grayish brown in most places but ranges from yellowish red to yellowish brown. A thin, discontinuous B horizon has begun to form in some places.

Profile of a Louisburg stony fine sandy loam (on property of Tallulah Falls School, near Tallulah Gorge)—

A_{00} 3 inches to 1 inch, leaves and twigs; boundary abrupt and smooth; 2 inches thick.

A_0 1 inch to 0, black (N 2/0), decayed leaves, twigs and roots; boundary clear and smooth; 2 inches thick.

A_1 0 to 2 inches, dark-brown (10YR 3/3) stony fine sandy loam; weak, fine, granular structure; very friable; many fine roots and pores; moderate content of organic matter; rapid permeability; strongly acid; boundary clear and wavy; 2 to 4 inches thick.

A_2 2 to 12 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, coarse, subangular blocky structure; very friable; few fine roots and pores; some gravel; moderately rapid permeability; strongly acid; boundary gradual and wavy; 10 to 12 inches thich; horizon is about 20 percent stones and gravel.

C 12 to 30 inches, light yellowish-brown (10YR 6/4) sandy loam; friable; massive material mixed with small rock and angular gravel; some mica flakes; strongly acid; boundary abrupt and wavy; 12 to 20 inches thick.

D 30 to 40 inches +, hard rock, quartzitic gneiss, and gneiss.

The parent rock crops out in many places and is solid or soft and saprolitic. Many stones are on the surface. The A horizon ranges from yellowish red to yellowish brown but is dark grayish brown in most places. An incipient B horizon occurs in a few places. Some profiles do not have a C horizon.

Alluvial Soils

Alluvial soils are in the azonal order. These soils are developing in recently deposited alluvium but have been

modified little by soil-forming processes. In Habersham County Alluvial soils occur on first bottoms along streams and in depressions in the uplands. They are nearly level to depressional. Internal drainage ranges from excessive to moderate. The horizons in the profile of Alluvial soils are not genetically related, because the soil materials have not been in place long enough to be affected by the active factors of soil formation.

Buncombe series.—This series consists of somewhat excessively drained, sandy soils that are developing in young general alluvium on the flood plains of large streams. These soils are nearly loose and noncoherent. Their profile consists mostly of loamy sand and shows little profile development. Buncombe soils are well within the range of Alluvial soils.

Profile of Buncombe loamy sands (1 mile east of junction of U.S. Highways Nos. 23 and 441 at Panther Creek)—

A 0 to 6 inches, light olive-brown (2.5Y 5/4) loamy sand; single-grain structure; loose to very friable; few fine pores; many roots; rapid permeability; strongly acid; boundary abrupt and smooth; 4 to 12 inches thick.

C 6 to 48 inches +, yellowish-brown (10YR 5/8) loamy sand; single grain (structureless); loose when moist; few roots; rapid permeability; strongly acid; more than 42 inches thick.

Where sediments were recently deposited, the surface layer may be light-gray, loose sand. It is stained dark gray by organic matter in some wooded areas. The C horizon varies considerably, including variation in thickness, because of the kinds of sediments and how they were laid down. This soil is sandy, but near the Congaree soils its content of silt and clay increases. In some places mica flakes are common throughout the profile.

Chewacla series.—This series consists of nearly level, somewhat poorly drained soils that are developing in young general alluvium on flood plains. These soils have weak, medium to fine, subangular blocky structure below the surface layer and are distinctly mottled below a depth of about 6 inches. They are Alluvial soils. The well-drained Congaree soils are also Alluvial soils but are not distinctly mottled in the upper 30 inches of the profile.

Profile of Chewacla silt loam (1 mile northeast of bridge that crosses Sutton Mill Creek on the bottom land along the Soque River)—

A_{11} 0 to 7 inches, dark-brown (10YR 3/3) silt loam; weak, medium, granular structure; very friable; many fine roots; many mica flakes; moderately rapid permeability; strongly acid; boundary clear and smooth; 5 to 10 inches thick.

A_{12} 7 to 18 inches, dark-brown (10YR 3/3) silt loam with few, fine, faint, yellowish-brown (10YR 5/4) mottles; weak, medium and fine, subangular blocky structure; very friable; many fine roots; few mica flakes; strongly acid; boundary clear and smooth; 6 to 12 inches thick.

C_1 18 to 28 inches, dark-brown (7.5YR 3/2) silt loam with common, medium, distinct, yellowish-red (5YR 5/6) mottles; weak, fine and medium, subangular blocky structure; very friable; few fine roots; moderate to moderately slow permeability; strongly acid; boundary clear and smooth; 6 to 15 inches thick.

C_2 28 to 36 inches, dark grayish-brown (2.5Y 4/2) silt loam with common, medium, distinct, strong-brown (7.5YR 5/6) mottles; weak, fine, subangular blocky structure; very friable; some very fine gravel; very few mica flakes; moderate to moderately slow permeability; strongly acid; more than 8 inches thick.

The surface layer ranges from silt loam to fine sandy loam. Distinct or prominent mottles occur at a depth of 6 to 18 inches but are generally at about 8 inches. Fine, faint mottles are closer to the surface. In some places the lower layers of the profile contain lenses of silt or of heavier material. Mica flakes are common.

Congaree series.—This series consists of nearly level to gently sloping, well-drained soils that are developing in young general alluvium and young local alluvium. The general alluvium is on flood plains along permanent streams; the local alluvium is at the head of draws. These are representative Alluvial soils.

Profile of Congaree silt loam (along the Soque River, 1⅝ miles northwest of the North Georgia Vocational School)—

A_1 0 to 8 inches, dark-brown (10YR 4/3) silt loam; weak, coarse, granular structure; very friable; many fine roots and pores; few fine mica flakes; low content of organic matter; moderately rapid permeability; strongly acid; boundary gradual and smooth; 6 to 10 inches thick.

C_1 8 to 14 inches, dark-brown (7.5YR 4/4) silt loam; weak, medium, subangular blocky structure; very friable; many fine roots and pores; few fine mica flakes; moderately rapid permeability; strongly acid; boundary clear and smooth; 4 to 6 inches thick.

C_2 14 to 19 inches, dark-brown (7.5YR 4/2) silt loam with common, medium, faint mottles; weak, medium, subangular blocky structure; very friable; few fine roots and pores; many fine mica flakes; strongly acid; boundary clear and smooth; 4 to 8 inches thick.

C_3 19 to 30 inches, dark-brown (7.5YR 4/2) silt loam; weak, medium, subangular blocky structure; very friable; few fine roots and pores; few fine mica flakes; strongly acid; boundary clear and smooth; 10 to 15 inches thick.

C_4 30 to 40 inches, dark-brown (10YR 4/3) fine sandy loam; weak, medium, subangular blocky structure; very friable; few fine roots; few pores; few fine mica flakes.

The surface layer ranges from light brownish gray, yellowish brown, gray, and reddish-brown to brown. Thin beds or lenses of sandy sediments may be present in any part of the profile. If these sediments are near the surface, however, the soil might be classified as some other type. Fine, faint mottles may exist at a depth of 14 to 30 inches. Below a depth of 30 inches, the texture may be sand, loamy sand, or gravel instead of the fine sandy loam described.

Profile of Congaree soils, local alluvium (on the south side of a dirt road, 0.7 mile northwest of Turnerville)—

A_{11} 0 to 9 inches, dark-brown (7.5YR 4/4) fine sandy loam; weak, coarse, granular structure; very friable; many fine roots and pores; few mica flakes; low content of organic matter; rapid permeability; some stains of organic matter; strongly acid; boundary gradual and smooth; 8 to 12 inches thick.

A_{12} 9 to 15 inches, dark-brown (7.5YR 4/4) fine sandy loam; weak, coarse, granular structure; very friable; many fine roots and pores; very faint mottles that are barely visible; many mica flakes; some stains of organic matter; moderately rapid permeability; strongly acid; boundary clear and smooth; 4 to 6 inches thick.

C_1 15 to 20 inches, dark-brown (10YR 4/3) loam with common, fine, faint, yellowish-brown (10YR 5/8) mottles; weak, medium, granular structure; very friable; few fine roots; decomposed roots and stains of organic matter; strongly acid; boundary clear and smooth; 4 to 8 inches thick.

C_2 20 to 36 inches +, yellowish-brown (10YR 5/8) fine sandy clay loam; moderate, medium, subangular blocky structure; friable; material deposited or washed in from higher areas.

The alluvial deposits range from 12 inches to several feet in thickness and are underlain by residual material. The surface soil is dark reddish brown if the alluvium is derived from basic material or from the uplands where the soils are eroded and have a dark-red clay loam and clay surface soil. The subsoil varies in texture from loamy sand to sandy clay loam.

General Nature of the Area

This section was written mainly for those not familiar with the county. It discusses location and extent, physiography, climate, vegetation, agriculture, and other subjects of general interest.

Location and Extent

Habersham County occupies 283 square miles, or 181,120 acres, in the northeastern part of Georgia. It is bounded on the north by Rabun County, on the east by Stephens County, on the south by Banks and Hall Counties, and on the west by White and Towns Counties. Clarkesville, the county seat and largest city, is about 75 miles northeast of Atlanta, 30 miles north of Gainesville, 45 miles north of Athens, and about 70 miles southwest of Greenville, S.C.

Physiography, Relief, and Drainage

Habersham County is in two broad physiographic provinces of Precambrian age—the Piedmont Plateau and the Blue Ridge Mountains. Most of the Piedmont Plateau is moderately dissected, but that part near the large streams is severely dissected. The topography is gently sloping to steep; the smoother areas are on the broad divides. Rocks are crystalline, complex, and contain many kinds of diverse minerals. Most of the farmland in the county is in the Piedmont.

The Blue Ridge Mountains have formed from highly metamorphosed masses of crystalline rock. The steep slopes and escarpments of gneissic material are probably the result of ancient mountain-building forces. Geologic erosion has not reduced elevations in these mountains so that they compare to elevations of the Piedmont. The topography is sloping to very steep, and there are few smooth areas. Most of the streams flow in V-shaped valleys. Tallulah Gorge, a noted tourist attraction, is steep and has rough walls of hard rock. It is on the border of Habersham and Rabun Counties.

Separate belts of Ashland schist and Brevard schist extend northeastward across the county. Much of the parent material is biotite gneiss and schist, but there are outcrops of basic material, quartzite, and muscovite schist. The quartzite is mostly near the northeastern corner of the county.

The drainage pattern in the county is dendritic. A high divide on the northern boundary of the county separates the streams that flow northward from those that flow southward. In the mountains are some of the headwaters of the Savannah and the Chattahoochee Rivers. The Chattahoochee River drains part of the county and flows southwestward, eventually into the Gulf of Mexico. The valley of this river is elevated in Habersham County and throughout most of its length. Other drainage in the county is generally southeastward into the Soque River and into the Broad and Tugaloo Rivers, which are in nearby counties. Large streams in the county are the Soque, Chattahoochee, and Tallulah Rivers. Smaller streams are Sautee, Hazel, Mud, Raper, and Deep Creeks.

Water Supply

The water supply is generally adequate for farm and home use. Wells and springs provide water for the farm homes. The wells are about 30 to 60 feet deep and supply water throughout the year. Small springs are common. Branches, creeks, large streams, and farm ponds are the main source of water for cattle and other livestock.

Climate [5]

The climate of Habersham County is humid and of moderate temperature. Summers are warm, but periods of extended heat are rare. Though winters are cold, the temperature seldom falls below zero. Rainfall is fairly well distributed throughout the year but is slightly higher in winter and early in spring than at other times. Measurable amounts of snow fall in about two-thirds of the winters.

Climatic data at Cornelia are summarized in table 9. The climate at Cornelia is fairly representative of the county but is slightly warmer and has less precipitation than the higher areas to the north where the terrain is about 1,500 feet higher than it is around Cornelia.

The mountains in the county influence the climate in summer and in winter. Both temperature and rainfall are affected in summer more than they are in winter. In winter cold air drains into the valley from the mountains, and the fruit trees in the valleys are more susceptible to damage by frost than are those on slopes.

Records at Cornelia show that the maximum temperature is 90° F. or more in only about one-third of the days in June, July, and August. A temperature of 100° or more is rare and has occurred only 22 days between 1926 and 1955. In summer the temperature at night is seldom above 70°; the average minimum temperature for the warmest month is about 66°. At Cornelia the highest temperature ever recorded was in July 1930, when it was 103°.

The average date of the last freezing temperature in spring is April 3, and that of the first in fall is November 4. The average frost-free growing season is 216 days. The latest freeze in spring has occurred as early as March 5 and as late as April 21. The first freeze in fall has been as early as October 7 and as late as November 25. Thus, there is a difference of about 7 weeks between the earliest and latest freezes in spring and in fall.

[5] Much of the information in this subsection was furnished by HORACE S. CARTER, State climatologist, United States Weather Bureau.

TABLE 9.—*Summary of temperature and precipitation at Cornelia, Habersham County, Ga.*

[Based on a 28-year record in period 1926 through 1955, excluding the years 1944 and 1950 when most of record was missing]

Month	Temperature in ° F.							Mean degree-days [1]	Precipitation in inches								Mean number of days with—			
	Means			Extremes								Snow and sleet					Maximum temperature of—		Minimum temperature of—	
	Daily maximum	Daily minimum	Monthly	Record highest	Year	Record lowest	Year		Mean	Greatest daily	Year	Mean	Maximum monthly	Year	Greatest daily	Year	90° and above	32° and below	32° and below	0° and below
January	53. 0	33. 4	43. 2	80	1949	−2	1942	690	5. 42	4. 13	1946	1. 4	14. 0	1940	11. 2	1940	0	1	15	[2]
February	55. 2	34. 0	44. 6	79	1938	6	1933	580	5. 25	2. 92	1936	. 9	10. 0	1936	5. 0	1929	0	[2]	13	0
March	61. 7	39. 2	50. 5	87	1938	8	1943	490	6. 12	4. 70	1952	. 7	10. 0	1942	10. 0	1942	0	[2]	8	0
April	71. 5	47. 4	59. 5	90	1937	23	1940	190	4. 80	3. 42	1943	[3]	[3]	1955	[3]	1955	0	0	1	0
May	79. 1	54. 8	67. 0	96	1938	33	1940	60	3. 97	3. 87	1934	0	0	------	0	------	1	0	0	0
June	85. 7	62. 6	74. 2	102	1933	41	1954	0	4. 38	4. 45	1949	0	0	------	0	------	8	0	0	0
July	88. 2	66. 1	77. 2	103	1930	50	1938	0	5. 71	4. 07	1938	0	0	------	0	------	13	0	0	0
August	86. 9	65. 3	76. 1	100	1936	51	1949	0	5. 36	7. 69	1940	0	0	------	0	------	9	0	0	0
September	82. 3	60. 3	71. 3	93	1954	39	1942	50	3. 88	10. 50	1936	0	0	------	0	------	4	0	0	0
October	72. 9	48. 7	60. 8	92	1954	23	1937	160	3. 27	4. 87	1934	[3]	[3]	1953	[3]	1953	[2]	0	1	0
November	60. 9	38. 8	49. 9	85	1935	11	1929	450	4. 24	4. 54	1948	[3]	[3]	1954	[3]	1954	0	[2]	9	0
December	52. 7	33. 2	43. 0	77	1933	7	1937	680	6. 42	3. 84	1931	1. 1	9. 8	1935	8. 8	1930	0	1	15	0
Year	70. 8	48. 7	59. 8	103	1930	−2	1942	3, 350	58. 82	10. 50	1936	4. 1	14. 0	1940	11. 2	1940	35	2	62	[2]

[1] Degree-days based on 65° F. The degree-days in a month are determined by subtracting, for each day in the month, the average daily temperature from 65. These daily values are totaled to obtain the number of degree-days in a month. To determine the mean degree-days for January in an 8-year period, total the degree-days for each January in that period and divide by 8.

[2] Less than half a day.

[3] Trace.

The driest part of the year is normally in fall, when long periods of clear, mild weather are common. A rain of more than 1 inch falls on the average of about 18 times per year and may occur in any month. Monthly extremes of rainfall have ranged from only a trace in October 1938 to 16.02 inches in December 1932. A complete crop failure caused by dry weather has never been recorded in the county. Streams seldom go dry.

The average annual snowfall was 3.9 inches at Cornelia for a 17-year period through 1952. The heaviest snow fell in the winter of 1935–36, when a total of 27.4 inches was recorded. More than 10 inches of snow fell in four other winters in the past 30 years.

Thunderstorms are common in summer and are sometimes accompanied by strong winds. The only storm of tornado force recorded in the county was on April 30, 1924. This storm caused damage at Cornelia estimated at $50,000.

Crops are likely to be damaged by frost early in spring and late in fall. The amount of damage depends somewhat on the hardiness of the plants and their stage of growth, but more important are the severity and duration of the freezing temperature. Also important is the abruptness of the drop in temperature.

Table 10 shows the probability of light, moderate, and severe freezing temperature late in spring and early in fall at Clarkesville. The data were compiled for a 35-year period (*2*). A light freeze damages only the most tender plants, a moderate freeze damages fruit blossoms and tender and semihardy plants, and a severe freeze kills or severely damages most vegetation. The damage by frost, however, can be reduced by selecting sites into which cold air does not drain from higher lying areas.

TABLE 10.—*Chance of last light, moderate, and severe freezing temperature in spring and first in fall at Clarksville*

Chance	Light freeze after—	Moderate freeze after—	Severe freeze after—	Light freeze before—	Moderate freeze before—	Severe freeze before—
1 in 2	Apr. 6	Mar. 25	Mar. 6	Oct. 25	Nov. 11	Nov. 22
1 in 5	Apr. 19	Apr. 5	Mar. 29	Oct. 14	Nov. 1	Nov. 18
1 in 10	Apr. 22	Apr. 16	Apr. 2	Oct. 18	Oct. 18	Nov. 8

Vegetation

The native forest of oak and pine that originally covered this county was typical of the forests in a broad area that extends eastward and southward from the mountains to the Coastal Plain (*3*). The present stands are much like the original. Dominant oaks are white oak (*Quercus alba*), mossycup or bur oak (*Q. macrocarpa*), common red oak (*Q. rubra*), scarlet oak (*Q. coccinea* var. *tuberculata*), black oak (*Q. velutina*), and blackjack oak (*Q. marilandica*). Shortleaf pine (*Pinus echinata*) and Virginia pine (*P. virginiana*) are the dominant pines, but there are a few loblolly pine (*P. taeda*). In the undergrowth are flowering dogwood (*Cornus florida*), greenbriar (*Smilax* sp.), wild rose (*Rosa* sp.), and blackberry briers (*Rubus* sp.). Abandoned fields are covered with broomsedge, which is gradually crowded out by young pines and a few sassafras and hardwoods.

Originally many chestnut trees grew in the mountains, but these have been exterminated by blight. Generally, yellow-poplar is in the moist sites, and white pine, at high elevations. The woodlands have been cut over severely, and various oaks and other hardwoods are dominant. Shortleaf pine and Virginia pine reseed naturally in abandoned areas and occur in scattered stands.

Wildlife

Wildlife is plentiful in the forests of Habersham County, and fish abound in the streams. Many animals roam the Chattahoochee National Forest, which makes up almost one-fourth of the county.

Deer, wild turkey, rabbit, and squirrel are the most common game animals in the county, but sportsmen also hunt bobwhite quail, raccoon, ruffed grouse, and woodchuck. Deer and turkey especially are protected in the national forest, and are increasing in number under good management. In some places that are as much as 1,500 feet above sea level, mountain trout thrive in the cool water of well-protected watersheds. Lakes formed by hydroelectric dams and farm ponds are stocked with fish.

Most soils of the county have sites suitable for farm ponds and for flood-control structures on small watersheds. The county agent or specialists of the Soil Conservation Service will furnish information about specific sites and about stocking the structures with fish.

Many plants grow well on most soils in the county and provide good food and cover for wildlife. Among these are bicolor lespedeza, browntop millet, Kobe lespedeza, field peas, sorghum, clover, shrubs, and trees. Field borders and odd areas provide good sites for food and cover but need to be fertilized regularly. A one-eighth acre strip produces enough food and cover for a covey of quail.

Settlement and Population

Scotch-Irish immigrants from Virginia and Pennsylvania were the first settlers in the county. They came to the northern part of Georgia because they could cross the lower Piedmont more easily than they could cross the hilly lands or the Coastal Plain. Later some of these settlers spread out toward the Blue Ridge Mountains and the Coastal Plain. The Blue Ridge Mountains continue to be a serious barrier to transportation, and the main streams of traffic skirt the southern margins of the hills.

Habersham County was created by the Georgia State legislature in 1818 from land acquired from the Cherokee Indians. The original area was later divided to form parts of Banks, Rabun, White, and Stephens Counties. The county was named for Maj. Joseph Habersham, a Revolutionary War patriot, who served in the United States Congress and was the Postmaster General in the Cabinet of President George Washington. Clarkesville, the county seat, was named for Governor John Clarke. Habersham County is in the Ninth Congressional District, in the 31st State Senatorial District, and in the Mountain Judicial State Court Circuit.

The population of Habersham County has steadily increased from 10,134 inhabitants in 1910 to 18,116 in 1960. Some of the more important towns are Demorest, Cornelia, Alto, and Mount Airy. Many of the farms are too small to support a family, and the members work in textile mills

and other factories. About 15 percent of the population works in these factories (*4*).

Transportation and Other Facilities

Two railroads serve the county. U.S. Highways No. 23, 123, and 441 pass generally north and south through the county, and State Routes 15, 115, 17, and 197 run east and west. All arable areas have access to all-weather roads, but the mountainous areas are served by dirt roads and trails.

The county has 17 consolidated schools. Piedmont College, which is coeducational, is in Demorest. The churches in the county represent several denominations.

According to the United States Census of Agriculture, in 1954 nearly half of the farms did not have tractors, horses, or mules. Only 23 percent of the farms had tractors. Nearly 7 percent of the farms had artificial ponds or reservoirs. Almost all farms had electricity, and 68 percent had piped running water. Electricity for light and power is supplied by rural cooperatives and by a privately owned company.

Agriculture

The early agriculture of Habersham County was self-sufficing. Corn, wheat, oats, barley, and rye were the main crops, and garden vegetables and fruits were also grown. Little cotton was grown because most of the labor was done by the family without the help of slaves. Cattle, hogs, and sheep were raised for meat, and wool was spun for clothes. Packhorses carried most of the products to market. Methods and tools were crude, and only a few acres were cultivated on each farm.

Transportation improved, and early in the 1830's, the price of cotton increased. At that time cotton alone was grown on some farms in the southern part of the county. But few acres are now in cotton. Livestock farming and general farming have prevailed since early settlement. Corn is the main crop.

Land Use, and Size and Tenure of Farms

According to the 1954 Census of Agriculture, the 1,207 farms in the county had a total area of 95,691 acres. Of this farmland 24 percent, or 22,938 acres, was cropland, but only a little more than 10,600 acres of the cropland was harvested. Woodland made up 59 percent of the farmland; pasture other than pastured cropland and woodland, 14 percent; and house lots, roads, wasteland, and other small areas, 3 percent.

In 1954 the 1,207 farms ranged in size from less than 3 to more than 1,000 acres but averaged 79.3 acres. About 14 percent of the farms were 9 acres or less, 23 percent were 10 to 29 acres, 19 percent were 30 to 49 acres, 22 percent were 50 to 99 acres, 15 percent were 100 to 219 acres, 5 percent were 220 to 499 acres, and only 2 percent were more than 500 acres.

Full owners operated 958 farms; part owners, 108 farms; managers, 2 farms; and tenants, 139 farms.

Farm Income

Farm products were sold for $2,704,242 in 1954. The percentages of this income accounted for by the sale of various products were:

Product	*Percent*
Field crops	3.3
Vegetables	.5
Fruits and nuts	8.4
Horticultural specialties	.3
Dairy products	3.0
Livestock and livestock products	5.8
Poultry and poultry products	77.7
Forest	1.1

Crops

Table 11 lists the number of acres in the county that were planted to important crops in 1949 and 1954, and the number of bearing fruit trees. These data are from the 1954 census. Local sources estimate that in 1960, 60 percent of the total acreage in row crops was in corn; 10 percent, in small grain; 10 percent, in truck crops, including pimento pepper; 12 percent, in legumes, including soybeans and cowpeas; and 8 percent, in sorghum, including grain sorghum.

TABLE 11.—*Acres of principal crops and bearing fruit trees in 1949 and 1954*

Crops	1949	1954
Corn for all purposes	8,443	5,747
Cotton harvested	1,433	459
Sorghum, all purposes except sirup	195	79
Oats threshed or combined	507	489
Wheat threshed or combined	240	169
Soybeans, all purposes:		
Grown alone	623	538
Grown with other crops	84	69
Cowpeas, all purposes except processing:		
Grown alone	261	97
Grown with other crops	99	15
Hay crops:		
Alfalfa, clover, and their mixtures	155	321
Lespedeza	787	219
Small grains	162	646
Other hay cut	458	822
Irish potatoes for home use or for sale	[1] 36	[2] 11
Sweetpotatoes for home use or for sale	[1] 50	[2] 4
Sugarcane or sorghum for sirup	43	32
Vegetables harvested for sale	171	159
Snapbeans (bush and pole types)	45	14
Sweet peppers and pimentos	37	99
Turnips	31	23
	Number [3]	*Number*
Apple trees	36,388	10,635
Peach trees	50,013	21,461
Pear trees	416	5,057

[1] Does not include acres for farms with less than 15 bushels harvested.

[2] Does not include acres for farms with less than 20 bushels harvested.

[3] One year later than year at head of column.

Livestock

Most farm income is from livestock and livestock products. Poultry is the most important product, for many farmers have specialized in the commercial production of broilers since 1940. Table 12 lists the number of livestock on farms in 1950 and 1954 as reported in the census of agriculture.

TABLE 12.—*Number of livestock on farms in 1950 and 1954*

Livestock	1950	1954
Cattle and calves	3, 808	5, 864
Milk cows	1, 704	1, 789
Chickens over 4 months old	55, 109	99, 005
Broilers sold	(1)	3, 091, 065
Hogs and pigs	2, 542	3, 581
Horses and mules	1, 121	682

[1] Not reported.

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Glossary

Acidity, soil. The degree of acidity or alkalinity of a soil mass technically expressed in pH values, or in words, as follows:

	pH		*pH*
Extremely acid	Below 4. 5	Neutral	6. 6–7. 3
Very strongly acid	4. 5–5. 0	Mildly alkaline	7. 4–8. 0
Strongly acid	5. 1–5. 5	Moderately alkaline	7. 9–8. 4
Medium acid	5. 6–6. 0	Strongly alkaline	8. 5–9. 0
Slightly acid	6. 1–6. 5	Very strongly alkaline	9. 1 and higher.

Aggregate. Many fine soil particles held in a single mass or cluster, such as a clod, crumb, block, or prism.

Alluvial soils. Soils forming in material recently deposited by water and showing little or no modification of the original materials by soil-forming processes.

Alluvium. Soil materials, such as sand, silt, or clay, deposited on land by streams.

Catena. A group of soils derived from similar parent material that differ greatly in characteristics because of differences in relief and drainage under which they have developed.

Clay. (1) As a soil separate, the mineral particles less than 0.002 millimeter in diameter. (2) As a soil textural class, soil material that contains 40 percent or more clay, as defined in (1), less than 45 percent sand, and less than 40 percent silt.

Colluvium. Mixed deposits of rock fragments and soil material near the base of slopes. The deposits have accumulated through soil creep, slides, or local wash.

Consistence, soil. The combination of properties of soil material that determine its resistance to crushing and its ability to be molded or changed in shape. The moisture content of a soil affects consistence, which is described by terms for a wet, moist, or dry soil. The descriptive terms for consistence are defined as follows:

Firm. When moist, soil material crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Friable. When moist, soil material crushes easily under gentle to moderate pressure between thumb and forefinger and coheres when pressed together.

Hard. When dry, soil material is moderately resistant to pressure, can be broken in hands without difficulty, but is barely breakable between thumb and forefinger.

Loose. Soil material is noncoherent when moist and when dry.

Plastic. When soil is wet, wire can be formed by rolling the soil between the hands, but moderate pressure is required to deform the soil mass.

Slightly plastic. When soil is wet, a wire is formable, but the soil mass is easily deformed.

Slightly sticky. When wet, soil adheres to both thumb and forefinger after pressure but comes off one or the other rather cleanly. It is not appreciably stretched when the fingers are separated.

Sticky. When wet, soil adheres to both thumb and forefinger after pressure and tends to stretch somewhat and to pull apart rather than pulling from either finger.

Very firm. When moist, soil material crushes under strong pressure; barely can be crushed between thumb and forefinger.

Very friable. When moist, soil material crushes under very gentle pressure but coheres when pressed together.

Very sticky. When wet, soil adheres strongly to both thumb and forefinger after pressure and is decidedly stretched when the fingers are separated.

Erosion. The wearing away or removal of soil material by water or wind.

Fertility, soil. The inherent quality of a soil as measured by the quantity of compounds provided for proper or balanced growth of plants.

First bottom. The normal flood plain of a stream that is likely to be flooded frequently or occasionally.

Horizon, soil. A layer of soil, approximately parellel to the soil surface, that has characteristics produced by soil-forming processes.

Horizon A. The master horizon consisting of (1) one or more mineral horizons of maximum organic accumulation; or (2) surface or subsurface horizons that are lighter in color than the underlying horizon and that have lost clay minerals, iron, and aluminum with resultant concentration of the more resistant minerals; or (3) horizons belonging to both of these categories.

Horizon B. The master horizon of altered material characterized by (1) an accumulation of clay, iron, or aluminum and accessory organic material; or (2) blocky or prismatic structure together with other characteristics, such as stronger colors, unlike those of the A horizon or the underlying horizons of nearly unchanged material; or (3) characteristics of both of these categories. Commonly, the lower limit of the B horizon corresponds to the lower limit of the solum.

Horizon C. A layer of unconsolidated material that has been affected relatively little by organisms and is thought to be similar in chemical, physical, and mineralogical composition to the material from which at least a part of the overlying solum has developed.

Infiltration. The downward entry of water into soil or other material.

Loam, soil. Soil having approximately equal amounts of sand, silt, and clay.

Mottled. Marked with spots of color and commonly a result of poor drainage. Descriptive terms for mottles follow: Contrast—*faint, distinct,* and *prominent;* abundance—*few, common,* and *many*; and size—*fine, medium,* and *coarse.* The size measurements are as follows: Fine, commonly less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; medium, commonly ranging between 5 and 15 millimeters (about 0.2 to 0.6 inch) along the greatest dimension; and coarse, commonly more than 15 millimeters (about 0.6 inch) along the greatest dimension.

Natural drainage. Conditions of drainage that existed during the development of the soil as opposed to altered drainage.

Parent material. The horizon of weathered rock or partly weathered soil material from which the soil was formed. Horizon C of the soil profile.

Permeability, soil. The quality of a soil that enables it to transmit air and water. A moderately permeable soil transmits air and water readily and is favorable for the growth of roots. A slowly permeable soil allows water and air to move so slowly that the growth of roots may be restricted. A rapidly permeable soil transmits air and water too rapidly for a good growth of roots.

Phase, soil. The subdivision of a soil type having variations not significant to classification of the soil in its natural landscape but significant to the use and management of the soil. Examples of the variations recognized in soil phases are differences in slope, in stoniness, and in thickness because of accelerated erosion.

Productivity, soil. The capability of a soil to produce a specified plant or sequence of plants under a defined set of management practices.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. (See Acidity).

Sand. (1) Individual rock or mineral fragments having diameters ranging from 0.05 millimeter (0.002 inch) to 2.0 millimeters (0.079 inch). Sand grains consist chiefly of quartz, but they may be of any mineral composition. (2) The textural class of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Saprolite. Disintegrated rock that lies in its original place.

Series, soil. A group of soils that, except for texture of the surface layer, are similar in profile characteristics and in arrangement of horizons. The soils of one series have developed from a particular type of parent material.

Silt. (1) Individual mineral particles of soil that range in diameter between the upper size of clay, 0.002 millimeter, and the lower size of very fine sand, 0.05 millimeter. (2) Soil of the textural class called silt contains 80 percent or more of silt and less than 12 percent of clay. (3) Sediments deposited from water in which the individual grains are approximately of the size of silt, although the term is sometimes applied loosely to sediments containing considerable sand and clay.

Root zone. That part of the soil penetrated by plant roots under normal conditions.

Soil. The natural medium for the growth of land plants. A soil is a natural three-dimensional body on the surface of the earth and is unlike adjoining bodies.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soils consists of the A and B horizons.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. These aggregates have properties unlike those of an equal mass of unaggregated primary soil particles. The following defined terms of soil structure are used in this report:

Blocky, angular. Aggregates are shaped in the form of blocks; most of the ped faces are flat or slightly concave, and angle vertices are sharp.

Blocky, subangular. Aggregates have some rounded and some plane surfaces; vertices are rounded.

Granular. Aggregates are roughly spherical, firm, and small and may be either hard or soft but are generally firmer than they are in crumb structure and without the distinct faces found in blocky structure.

The following terms are used to indicate a lack of definite structure:

Single grain (*structureless*). Each grain by itself, as in dune sand.

Massive (*structureless*). Large, uniform masses of cohesive soil material, sometimes with irregular cleavage, as in the C horizon of many heavy clay soils.

Subsoil. Technically, the B horizon; commonly, that part of the profile below plow depth.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil; about 5 to 8 inches thick.

Terrace (geological). An old alluvial plain, generally flat or undulating, bordering a stream; frequently called second bottom, as contrasted with flood plain; seldom subject to flooding.

Texture, soil. The relative proportions of the various size groups of individual soil grains in a mass of soil; specifically, the proportions of sand, silt, and clay. The textural classes of soil arranged according to their increasing content of the finer separates, are as follows: *Sand, loamy sand, sandy loam, loam, silt loam,* and *clay.* These classes may be modified according to relative size of the coarser particles; for example, *fine sandy loam.*

Tilth, soil. The condition of the soil, especially soil structure, as it is related to the growth of plants. A soil in good tilth is friable, has stable, granular structure, and has high porosity without much capillarity. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil. Presumably fertile material used to dress roadbanks, gardens, and lawns.

Type, soil. A subdivision of the soil series based on the texture of the surface layer.

Upland (geologic). Land consisting of material unworked by water in recent geologic time and ordinarily lying at a higher elevation than the alluvial plain or stream terrace.

Weathering. The physical and chemical disintegration and decomposition of rocks and minerals.

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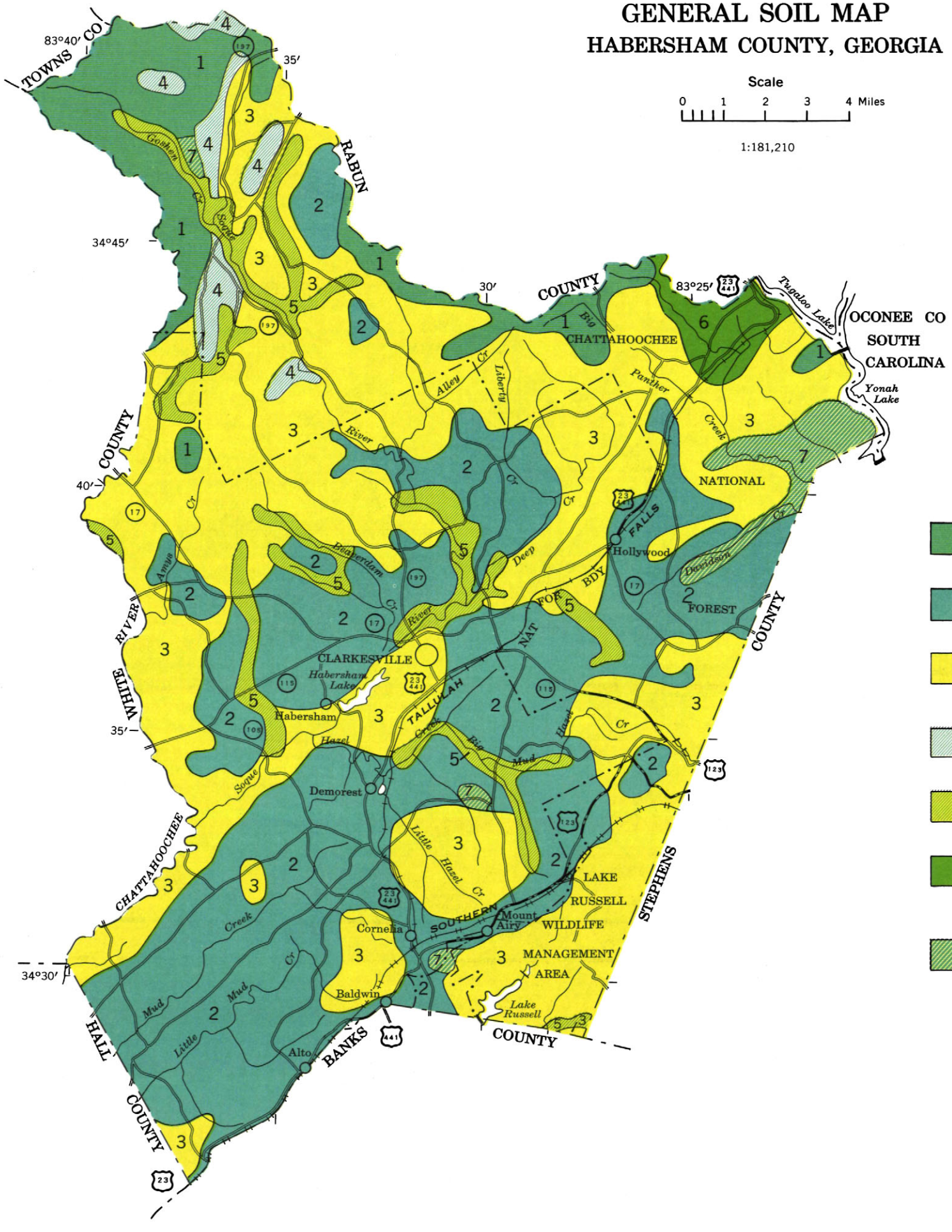
GENERAL SOIL MAP
HABERSHAM COUNTY, GEORGIA

Scale

0 1 2 3 4 Miles

1:181,210



SOIL ASSOCIATIONS

1 — Porters-Ashe Association: Well-drained to somewhat excessively drained, steep and very steep soils on mountains and high ridges; derived from granite and gneiss.

2 — Madison-Halewood Association: Well-drained, moderately deep, gently sloping to steep soils on uplands; derived from quartz mica schist and mica schist.

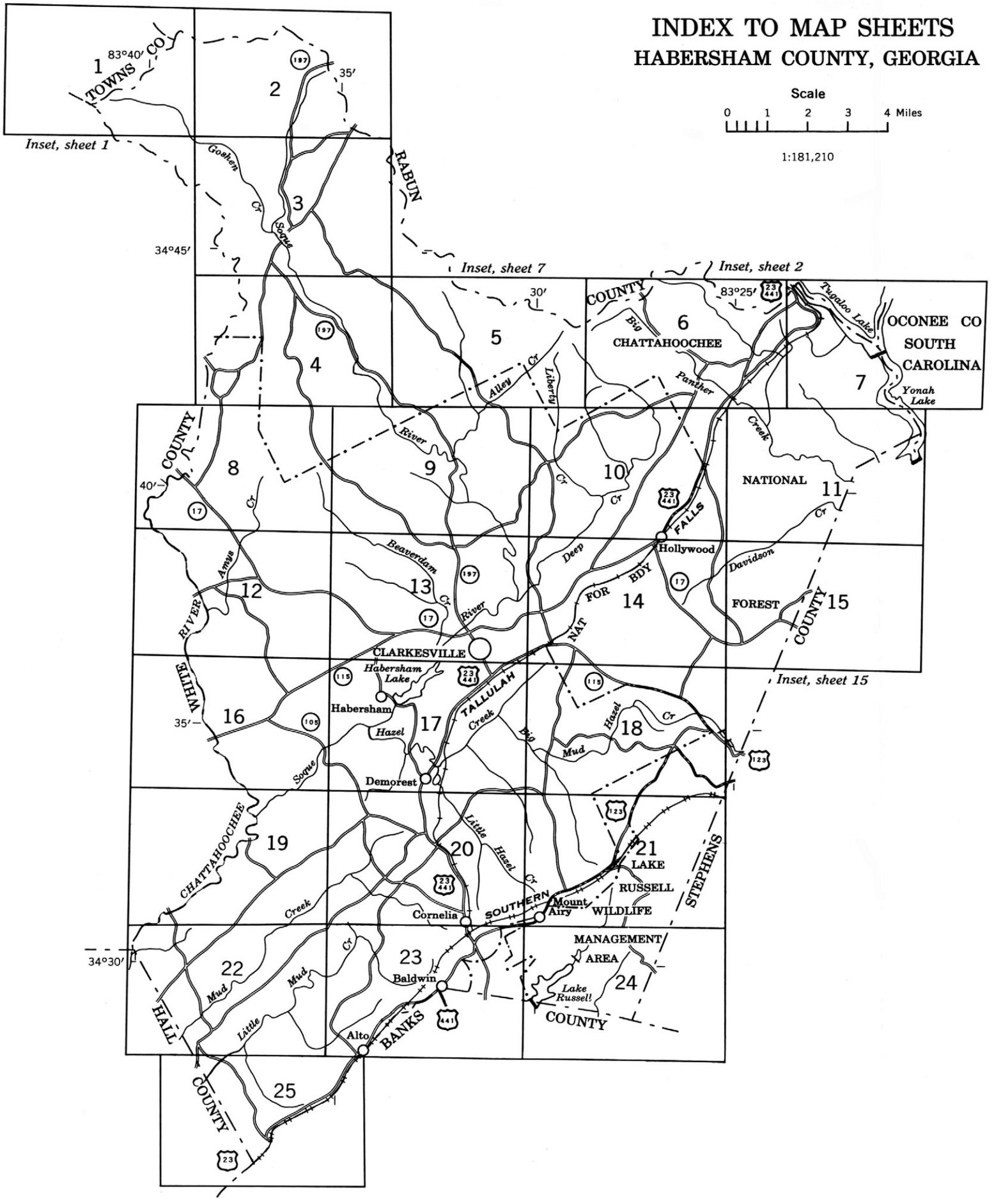
3 — Cecil-Madison Association: Well-drained, moderately deep and deep, gently sloping to steep soils on ridgetops and side slopes; derived from gneiss and micaceous schist.

4 — Clifton-Davidson Association: Well-drained, moderately shallow to moderately deep, moderately steep and steep soils on ridgetops and side slopes; derived from basic rocks.

5 — Congaree-Chewacla-Buncombe Association: Well-drained to somewhat poorly drained soils on flood plains.

6 — Louisburg-Habersham Association: Well-drained to somewhat excessively drained soils on sloping ridgetops and steep side slopes; derived from quartzite and quartzitic gneiss, granite, and schist.

7 — Louisa-Chandler Association: Somewhat excessively drained, shallow soils on narrow, high ridgetops and moderately steep to very steep side slopes; derived from mica schist, schist, and micaceous gneiss.


INDEX TO MAP SHEETS
HABERSHAM COUNTY, GEORGIA
Scale
0 1 2 3 4 Miles
1:181,210
N
1
TOWNS CO
83°40′
35′
2
3
RABUN
Inset, sheet 1
Goshen Cr
Soque
34°45′
Inset, sheet 7
Inset, sheet 2
30′
4
5
COUNTY
83°25′
6
CHATTAHOOCHEE
Big Alley Cr
Liberty
Panther Creek
Tugaloo Lake
OCONEE CO
SOUTH CAROLINA
7
Yonah Lake
8
9
10
11
NATIONAL
FOREST
COUNTY
40′
River
Cr
FALLS
Hollywood
Beaverdam Cr
Deep
Davidson
12
13
14
15
Amos
RIVER
FOR BDY
NAT
CLARKESVILLE
Habersham Lake
Inset, sheet 15
WHITE
35′
16
17
18
Habersham
Hazel
TALLULAH Creek
Big Mud Cr
Soque
Demorest
19
20
21
CHATTAHOOCHEE
Little Hazel Cr
LAKE RUSSELL WILDLIFE MANAGEMENT AREA
STEPHENS
Creek
Cornelia
SOUTHERN
Mount Airy
34°30′
22
23
24
Mud
Little
Baldwin
Lake Russell
HALL
BANKS
COUNTY
Alto
25
COUNTY

GUIDE TO MAPPING UNITS

[See table 1, p. 4, for approximate acreage and proportionate extent of the soils and table 2, p. 36 for estimated yields of each soil. See pp. 47 to 60 for information on engineering properties of the soils]

Map symbol	Soil name	Page	Capability Unit		Woodland suitability group	
			Symbol	Page	Number	Page
AkA	Altavista fine sandy loam, 0 to 2 percent slopes	5	I–2	28	4B	44
AkB	Altavista fine sandy loam, 2 to 6 percent slopes	5	IIe–2	29	4B	44
AkB2	Altavista fine sandy loam, 2 to 6 percent slopes, eroded	6	IIe–2	29	4B	44
Alm	Alluvial land	3	IIw–2	29	1	41
AmB2	Appling sandy loam, 2 to 6 percent slopes, eroded	6	IIe–2	29	4B	44
AmC2	Appling sandy loam, 6 to 10 percent slopes, eroded	6	IIIe–2	31	4B	44
Avp	Alluvial land, wet	5	IIIw–2	31	2	41
AwA	Augusta silt loam, 0 to 2 percent slopes	6	IIIw–3	31	2	41
AwB	Augusta silt loam, 2 to 6 percent slopes	7	IIIw–3	31	2	41
Bfs	Buncombe loamy sands	7	IIIs–1	32	14	46
CaE	Cecil stony sandy loam, 15 to 25 percent slopes	9	VIIs–1	35	7	44
Cfl	Chewacla fine sandy loam	10	IIIw–2	31	2	41
CiB	Colfax sandy loam, 2 to 6 percent slopes	11	IIIw–3	31	4B	44
CiC2	Colfax sandy loam, 6 to 10 percent slopes, eroded	11	VIe–2	34	4B	44
Cng	Congaree soils, local alluvium	12	I–1	28	1	41
Con	Congaree silt loam	12	IIw–2	29	1	41
Csl	Chewacla silt loam	10	IIIw–2	31	2	41
CuF	Cecil sandy loam, thin solum, 25 to 60 percent slopes	8	VIIe–1	34	12	45
CzF	Cecil stony sandy loam, thin solum, 25 to 60 percent slopes	9	VIIs–1	35	12	45
CCE	Chandler loam, 15 to 25 percent slopes	9	VIIe–2	35	10	45
CCF	Chandler loam, 25 to 60 percent slopes	9	VIIe–2	35	12	45
CCG	Chandler loam, 60 to 95 percent slopes	9	VIIe–2	35	15	46
CKE	Clifton-Davidson complex, 15 to 25 percent slopes	10	VIe–2	34	5	44
CKF	Clifton-Davidson complex, 25 to 60 percent slopes	10	VIIe–1	34	12	45
CLE	Clifton-Davidson stony complex, 15 to 25 percent slopes	11	VIe–1	34	7	44
CLF	Clifton-Davidson stony complex, 25 to 60 percent slopes	11	VIIe–2	35	12	45
CLG	Clifton-Davidson stony complex, 60 to 90 percent slopes	11	VIIe–2	35	15	46
CYB2	Cecil sandy loam, 2 to 6 percent slopes, eroded	8	IIe–1	28	4A	43
CYC	Cecil sandy loam, 6 to 10 percent slopes	7	IIIe–1	30	4A	43
CYC2	Cecil sandy loam, 6 to 10 percent slopes, eroded	8	IIIe–1	30	4A	43
CYD	Cecil sandy loam, 10 to 15 percent slopes	7	IVe–1	32	4A	43
CYD2	Cecil sandy loam, 10 to 15 percent slopes, eroded	8	IVe–1	32	4A	43
CYE	Cecil sandy loam, 15 to 25 percent slopes	8	VIe–2	34	5	44
CYE2	Cecil sandy loam, 15 to 25 percent slopes, eroded	8	VIe–2	34	5	44
CZC3	Cecil sandy clay loam, 6 to 10 percent slopes, severely eroded	8	IVe–2	33	3	41
CZD3	Cecil sandy clay loam, 10 to 15 percent slopes, severely eroded	9	VIe–2	34	3	41
CZE3	Cecil sandy clay loam, 15 to 25 percent slopes, severely eroded	9	VIIe–1	34	11	45
DnD2	Davidson loam, thin solum, 10 to 15 percent slopes, eroded	12	IVe–1	32	9	45
DnE	Davidson loam, thin solum, 15 to 25 percent slopes	12	VIe–2	34	9	45
DnF	Davidson loam, thin solum, 25 to 60 percent slopes	12	VIIe–1	34	12	45
HAB2	Habersham fine sandy loam, 2 to 6 percent slopes, eroded	13	IIe–2	29	4B	44
HAC	Habersham fine sandy loam, 6 to 10 percent slopes	13	IIIe–2	31	4B	44
HAC2	Habersham fine sandy loam, 6 to 10 percent slopes, eroded	13	IIIe–2	31	4B	44
HAD2	Habersham fine sandy loam, 10 to 15 percent slopes, eroded	13	IVe–1	32	4B	44
HEB2	Halewood fine sandy loam, 2 to 6 percent slopes, eroded	14	IIe–2	29	4B	44
HEC	Halewood fine sandy loam, 6 to 10 percent slopes	13	IIIe–2	31	4B	44
HEC2	Halewood fine sandy loam, 6 to 10 percent slopes, eroded	14	IIIe–2	31	4B	44
HED	Halewood fine sandy loam, 10 to 15 percent slopes	14	IVe–1	32	4B	44
HEE	Halewood fine sandy loam, 15 to 25 percent slopes	14	VIe–2	34	5	44
HEF	Halewood fine sandy loam, 25 to 60 percent slopes	14	VIIe–1	34	12	45
HRC3	Hiwassee fine sandy clay loam, 6 to 10 percent slopes, severely eroded	15	IVe–2	33	3	41
HRD3	Hiwassee fine sandy clay loam, 10 to 15 percent slopes, severely eroded	15	IVe–2	33	3	41
HQB2	Hiwassee fine sandy loam, 2 to 6 percent slopes, eroded	14	IIe–1	28	4A	43
HQC2	Hiwassee fine sandy loam, 6 to 10 percent slopes, eroded	15	IIIe–1	30	4A	43
HQD2	Hiwassee fine sandy loam, 10 to 15 percent slopes, eroded	15	IVe–1	32	4A	43
LeC3	Lloyd clay loam, 6 to 10 percent slopes, severely eroded	16	IVe–2	33	8	45
LeD3	Lloyd clay loam, 10 to 15 percent slopes, severely eroded	16	IVe–2	33	8	45
LfB2	Lloyd loam, 2 to 6 percent slopes, eroded	16	IIe–1	28	9	45
LfC	Lloyd loam, 6 to 10 percent slopes	15	IIIe–1	30	9	45
LfC2	Lloyd loam, 6 to 10 percent slopes, eroded	16	IIIe–1	30	9	45
LfD2	Lloyd loam, 10 to 15 percent slopes, eroded	16	IVe–1	32	9	45
LjE	Louisa fine sandy loam, 15 to 25 percent slopes	17	VIIe–2	35	5	44
LjF	Louisa fine sandy loam, 25 to 60 percent slopes	17	VIIe–2	35	12	45
LjG	Louisa fine sandy loam, 60 to 90 percent slopes	17	VIIe–2	35	15	46
LkE3	Louisa fine sandy clay loam, 15 to 25 percent slopes, severely eroded	17	VIIe–2	35	13	46
LnD2	Louisburg sandy loam, 10 to 15 percent slopes, eroded	17	VIe–3	34	4B	44
LnE	Louisburg sandy loam, 15 to 25 percent slopes	17	VIIe–2	35	5	44
LHD	Louisburg-Habersham stony fine sandy loams, 10 to 15 percent slopes	18	VIIs–1	35	6	44
LHD3	Louisburg-Habersham stony fine sandy loams, 10 to 15 percent slopes, severely eroded	18	VIIs–1	35	6	44
LHE	Louisburg-Habersham stony fine sandy loams, 15 to 25 percent slopes	18	VIIs–1	35	7	44
LHF	Louisburg-Habersham stony fine sandy loams, 25 to 60 percent slopes	17	VIIs–1	35	12	45
MjB2	Madison fine sandy loam, 2 to 6 percent slopes, eroded	19	IIe–1	28	4A	43
MjC	Madison fine sandy loam, 6 to 10 percent slopes	18	IIIe–1	30	4A	43
MjC2	Madison fine sandy loam, 6 to 10 percent slopes, eroded	19	IIIe–1	30	4A	43
MjD	Madison fine sandy loam, 10 to 15 percent slopes	19	IVe–1	32	4A	43
MjD2	Madison fine sandy loam, 10 to 15 percent slopes, eroded	19	IVe–1	32	4A	43
MjE	Madison fine sandy loam, 15 to 25 percent slopes	19	VIe–2	34	5	44
MjE2	Madison fine sandy loam, 15 to 25 percent slopes, eroded	20	VIe–2	34	5	44
MjF	Madison fine sandy loam, 25 to 60 percent slopes	19	VIIe–1	34	12	45
MkB3	Madison fine sandy clay loam, 2 to 6 percent slopes, severely eroded	20	IIIe–1	30	3	41
MkC3	Madison fine sandy clay loam, 6 to 10 percent slopes, severely eroded	20	IVe–2	33	3	41
MkC4	Madison fine sandy clay loam, 6 to 10 percent slopes, very severely eroded	20	VIe–2	34	13	46
MkD3	Madison fine sandy clay loam, 10 to 15 percent slopes, severely eroded	20	VIe–2	34	3	41
MkD4	Madison fine sandy clay loam, 10 to 15 percent slopes, very severely eroded	20	VIIe–I	34	13	46
MkE3	Madison fine sandy clay loam, 15 to 25 percent slopes, severely eroded	20	VIIe–I	34	11	45
MkE4	Madison fine sandy clay loam, 15 to 25 percent slopes, very severely eroded	21	VIIe–1	34	13	46
MoB2	Masada fine sandy loam, 2 to 6 percent slopes, eroded	21	IIe–2	29	4A	43
MoC2	Masada fine sandy loam, 6 to 10 percent slopes, eroded	21	IIIe–2	31	4A	43
MoC3	Masada fine sandy loam, 6 to 10 percent slopes, severely eroded	21	IVe–1	32	3	41
MwD3	Musella stony clay loam, 10 to 15 percent slopes, severely eroded	22	VIe–1	34	6	44
MwE2	Musella stony clay loam, 15 to 25 percent slopes, eroded	22	VIe–1	34	7	44
PcD	Porters loam, 10 to 15 percent slopes	22	IVe–1M	32	10	45
PcE	Porters loam, 15 to 25 percent slopes	22	VIe–2	34	10	45
PcF	Porters loam, 25 to 60 percent slopes	22	VIIe–1	34	12	45
PcG	Porters loam, 60 to 80 percent slopes	23	VIIe–1	34	15	46
PAE	Porters-Ashe stony loams, 15 to 25 percent slopes	23	VIIs–1	35	7	44
PAF	Porters-Ashe stony loams, 25 to 60 percent slopes	23	VIIe–2	35	12	45
PAG	Porters-Ashe stony loams, 60 to 95 percent slopes	23	VIIe–2	35	15	46
Roa	Roanoke fine sandy loam	23	IVw–2	33	16	46
TlB	Tusquitee loam, 2 to 6 percent slopes	24	IIe–1M	29	4A	43
TlC	Tusquitee loam, 6 to 10 percent slopes	24	IIIe–1M	30	4A	43
TlC2	Tusquitee loam, 6 to 10 percent slopes, eroded	24	IIIe–1M	30	4A	43
TlD	Tusquitee loam, 10 to 15 percent slopes	24	IVe–1M	32	4A	43
TlD2	Tusquitee loam, 10 to 15 percent slopes, eroded	24	IVe–1M	32	4A	43
TmC	Tusquitee stony loam, 6 to 10 percent slopes	24	VIe–1	34	4A	43
TmD	Tusquitee stony loam, 10 to 15 percent slopes	24	VIe–1	34	4A	43
WaE	Watauga loam, 15 to 25 percent slopes	25	VIe–2	34	5	44
WaF	Watauga loam, 25 to 60 percent slopes	25	VIIe–1	34	12	45
Wea	Wehadkee silt loam	25	IVw–1	33	16	46
WgB2	Wickham fine sandy loam, 2 to 6 percent slopes, eroded	26	IIe–1	28	4A	43
WgC2	Wickham fine sandy loam, 6 to 10 percent slopes, eroded	26	IIIe–1	30	4A	43
WhC3	Wickham clay loam, 6 to 10 percent slopes, severely eroded	26	IVe–2	33	3	41

SOILS LEGEND

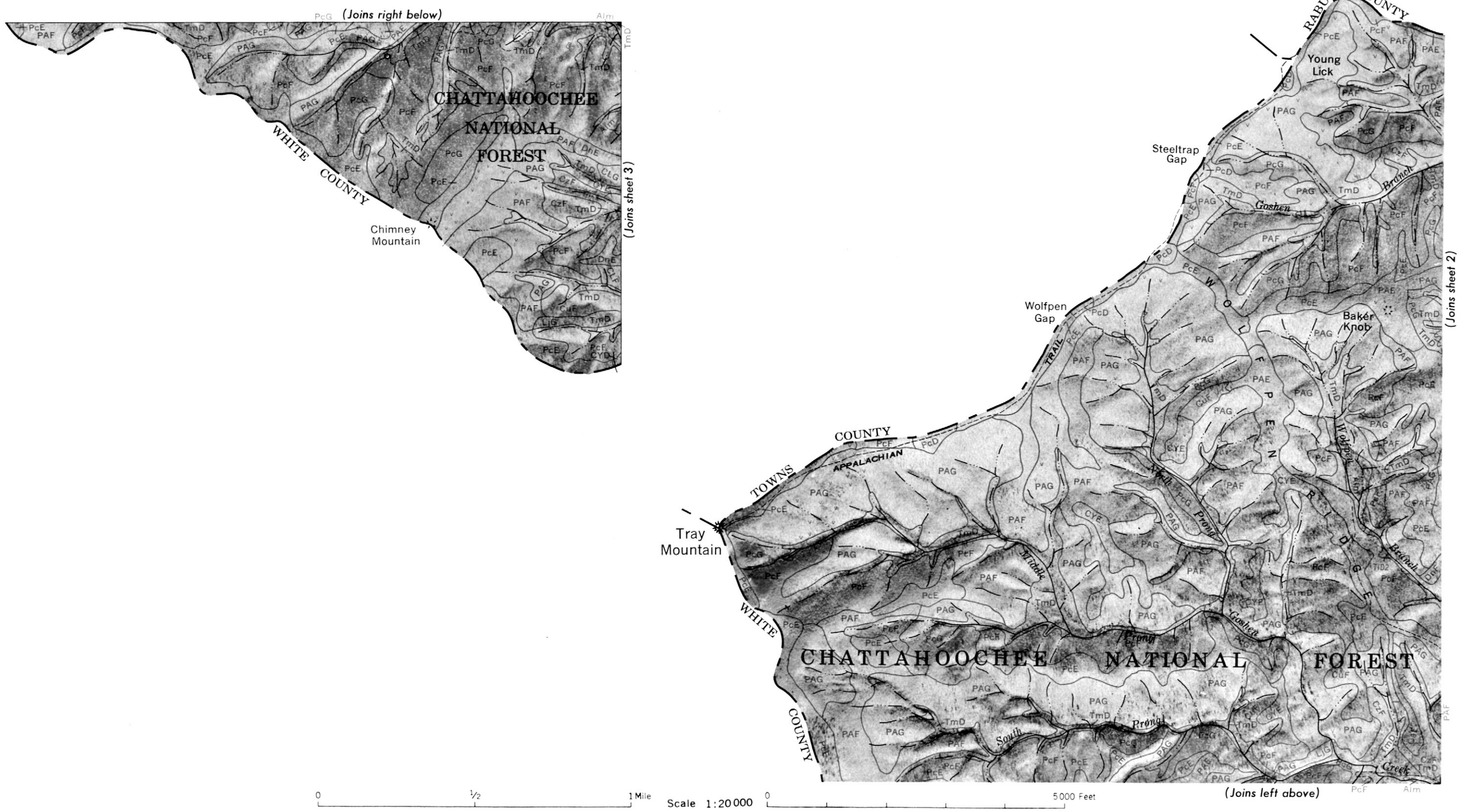
The first letter in each soil symbol is the initial of the soil series name. If the third letter is a capital, it denotes the range of slope from A, less than 2 percent, to G, 60 to 95 percent. A number after the slope letter denotes the degree of erosion as given in the soil name. The symbols that do not contain a slope letter or a number are symbols for nearly level soils, not more than slightly eroded. Alm, Alluvial land, and Avp, Alluvial land, wet, are land types that are nearly level.

	NAME
AkA	Altavista fine sandy loam, 0 to 2 percent slopes
AkB	Altavista fine sandy loam, 2 to 6 percent slopes
AkB2	Altavista fine sandy loam, 2 to 6 percent slopes, eroded
Alm	Alluvial land
AmB2	Appling sandy loam, 2 to 6 percent slopes, eroded
AmC2	Appling sandy loam, 6 to 10 percent slopes, eroded
Avp	Alluvial land, wet
AwA	Augusta silt loam, 0 to 2 percent slopes
AwB	Augusta silt loam, 2 to 6 percent slopes
Bfs	Buncombe loamy sands
CaE	Cecil stony sandy loam, 15 to 25 percent slopes
Cfl	Chewacla fine sandy loam
CiB	Colfax sandy loam, 2 to 6 percent slopes
CiC2	Colfax sandy loam, 6 to 10 percent slopes, eroded
Cng	Congaree soils, local alluvium
Con	Congaree silt loam
Csl	Chewacla silt loam
CuF	Cecil sandy loam, thin solum, 25 to 60 percent slopes
CzF	Cecil stony sandy loam, thin solum, 25 to 60 percent slopes
CCE	Chandler loam, 15 to 25 percent slooes
CCF	Chandler loam, 25 to 60 percent slopes
CCG	Chandler loam, 60 to 95 percent slopes
CKE	Clifton-Davidson complex, 15 to 25 percent slopes
CKF	Clifton-Davidson complex, 25 to 60 percent slopes
CLE	Clifton-Davidson stony complex, 15 to 25 percent slopes
CLF	Clifton-Davidson stony complex, 25 to 60 percent slopes
CLG	Clifton-Davidson stony complex, 60 to 90 percent slopes
CYB2	Cecil sandy loam, 2 to 6 percent slopes, eroded
CYC	Cecil sandy loam, 6 to 10 percent slopes
CYC2	Cecil sandy loam, 6 to 10 percent slopes, eroded
CYD	Cecil sandy loam, 10 to 15 percent slopes
CYD2	Cecil sandy loam, 10 to 15 percent slopes, eroded
CYE	Cecil sandy loam, 15 to 25 percent slopes
CYE2	Cecil sandy loam, 15 to 25 percent slopes, eroded
CZC3	Cecil sandy clay loam, 6 to 10 percent slopes, severely eroded
CZD3	Cecil sandy clay loam, 10 to 15 percent slopes, severely eroded
CZE3	Cecil sandy clay loam, 15 to 25 percent slopes, severely eroded
DnD2	Davidson loam, thin solum, 10 to 15 percent slopes, eroded
DnE	Davidson loam, thin solum, 15 to 25 percent slopes
DnF	Davidson loam, thin solum, 25 to 60 percent slopes
HAB2	Habersham fine sandy loam, 2 to 6 percent slopes, eroded
HAC	Habersham fine sandy loam, 6 to 10 percent slopes
HAC2	Habersham fine sandy loam, 6 to 10 percent slopes, eroded
HAD2	Habersham fine sandy loam, 10 to 15 percent slopes, eroded
HEB2	Halewood fine sandy loam, 2 to 6 percent slopes, eroded
HEC	Halewood fine sandy loam, 6 to 10 percent slopes
HEC2	Halewood fine sandy loam, 6 to 10 percent slopes, eroded
HED	Halewood fine sandy loam, 10 to 15 percent slopes
HEE	Halewood fine sandy loam, 15 to 25 percent slopes
HEF	Halewood fine sandy loam, 25 to 60 percent slopes
HRC3	Hiwassee fine sandy clay loam, 6 to 10 percent slopes, severely eroded
HRD3	Hiwassee fine sandy clay loam, 10 to 15 percent slopes, severely eroded
HQB2	Hiwassee fine sandy loam, 2 to 6 percent slopes, eroded
HQC2	Hiwassee fine sandy loam, 6 to 10 percent slopes, eroded
HQD2	Hiwassee fine sandy loam, 10 to 15 percent slopes, eroded

	NAME
LeC3	Lloyd clay loam, 6 to 10 percent slopes, severely eroded
LeD3	Lloyd clay loam, 10 to 15 percent slopes, severely eroded
LfB2	Lloyd loam, 2 to 6 percent slopes, eroded
LfC	Lloyd loam, 6 to 10 percent slopes
LfC2	Lloyd loam, 6 to 10 percent slopes, eroded
LfD2	Lloyd loam, 10 to 15 percent slopes, eroded
LjE	Louisa fine sandy loam, 15 to 25 percent slopes
LjF	Louisa fine sandy loam, 25 to 60 percent slopes
LjG	Louisa fine sandy loam, 60 to 90 percent slopes
LkE3	Louisa fine sandy clay loam, 15 to 25 percent slopes, severely eroded
LnD2	Louisburg sandy loam, 10 to 15 percent slopes, eroded
LnE	Louisburg sandy loam, 15 to 25 percent slopes
LHD	Louisburg-Habersham stony fine sandy loams, 10 to 15 percent slopes
LHD3	Louisburg-Habersham stony fine sandy loams, 10 to 15 percent slopes, severely eroded
LHE	Louisburg-Habersham stony fine sandy loams, 15 to 25 percent slopes
LHF	Louisburg-Habersham stony fine sandy loams, 25 to 60 percent slopes
MjB2	Madison fine sandy loam, 2 to 6 percent slopes, eroded
MjC	Madison fine sandy loam, 6 to 10 percent slopes
MjC2	Madison fine sandy loam, 6 to 10 percent slopes, eroded
MjD	Madison fine sandy loam, 10 to 15 percent slopes
MjD2	Madison fine sandy loam, 10 to 15 percent slopes, eroded
MjE	Madison fine sandy loam, 15 to 25 percent slopes
MjE2	Madison fine sandy loam, 15 to 25 percent slopes, eroded
MjF	Madison fine sandy loam, 25 to 60 percent slopes
MkB3	Madison fine sandy clay loam, 2 to 6 percent slopes, severely eroded
MkC3	Madison fine sandy clay loam, 6 to 10 percent slopes, severely eroded
MkC4	Madison fine sandy clay loam, 6 to 10 percent slopes, very severely eroded
MkD3	Madison fine sandy clay loam, 10 to 15 percent slopes, severely eroded
MkD4	Madison fine sandy clay loam, 10 to 15 percent slopes, very severely eroded
MkE3	Madison fine sandy clay loam, 15 to 25 percent slopes, severely eroded
MkE4	Madison fine sandy clay loam, 15 to 25 percent slopes, very severely eroded
MoB2	Masada fine sandy loam, 2 to 6 percent slopes, eroded
MoC2	Masada fine sandy loam, 6 to 10 percent slopes, eroded
MoC3	Masada fine sandy loam, 6 to 10 percent slopes, severely eroded
MwD3	Musella stony clay loam, 10 to 15 percent slopes, severely eroded
MwE2	Musella stony clay loam, 15 to 25 percent slopes, eroded
PcD	Porters loam, 10 to 15 percent slopes
PcE	Porters loam, 15 to 25 percent slopes
PcF	Porters loam, 25 to 60 percent slopes
PcG	Porters loam, 60 to 80 percent slopes
PAE	Porters-Ashe stony loams, 15 to 25 percent slopes
PAF	Porters-Ashe stony loams, 25 to 60 percent slopes
PAG	Porters-Ashe stony loams, 60 to 95 percent slopes
Roa	Roanoke fine sandy loam
TlB	Tusquitee loam, 2 to 6 percent slopes
TlC	Tusquitee loam, 6 to 10 percent slopes
TlC2	Tusquitee loam, 6 to 10 percent slopes, eroded
TlD	Tusquitee loam, 10 to 15 percent slopes
TlD2	Tusquitee loam, 10 to 15 percent slopes, eroded
TmC	Tusquitee stony loam, 6 to 10 percent slopes
TmD	Tusquitee stony loam, 10 to 15 percent slopes
WaE	Watauga loam, 15 to 25 percent slopes
WaF	Watauga loam, 25 to 60 percent slopes
Wea	Wehadkee silt loam
WgB2	Wickham fine sandy loam, 2 to 6 percent slopes, eroded
WgC2	Wickham fine sandy loam, 6 to 10 percent slopes, eroded
WhC3	Wickham clay loam, 6 to 10 percent slopes, severely eroded

Soil map constructed 1961 by Cartographic Division, Soil Conservation Service, USDA, from 1956 aerial photographs. Controlled mosaic based on Georgia plane coordinate system, west zone, transverse Mercator projection, 1927 North American datum.

N



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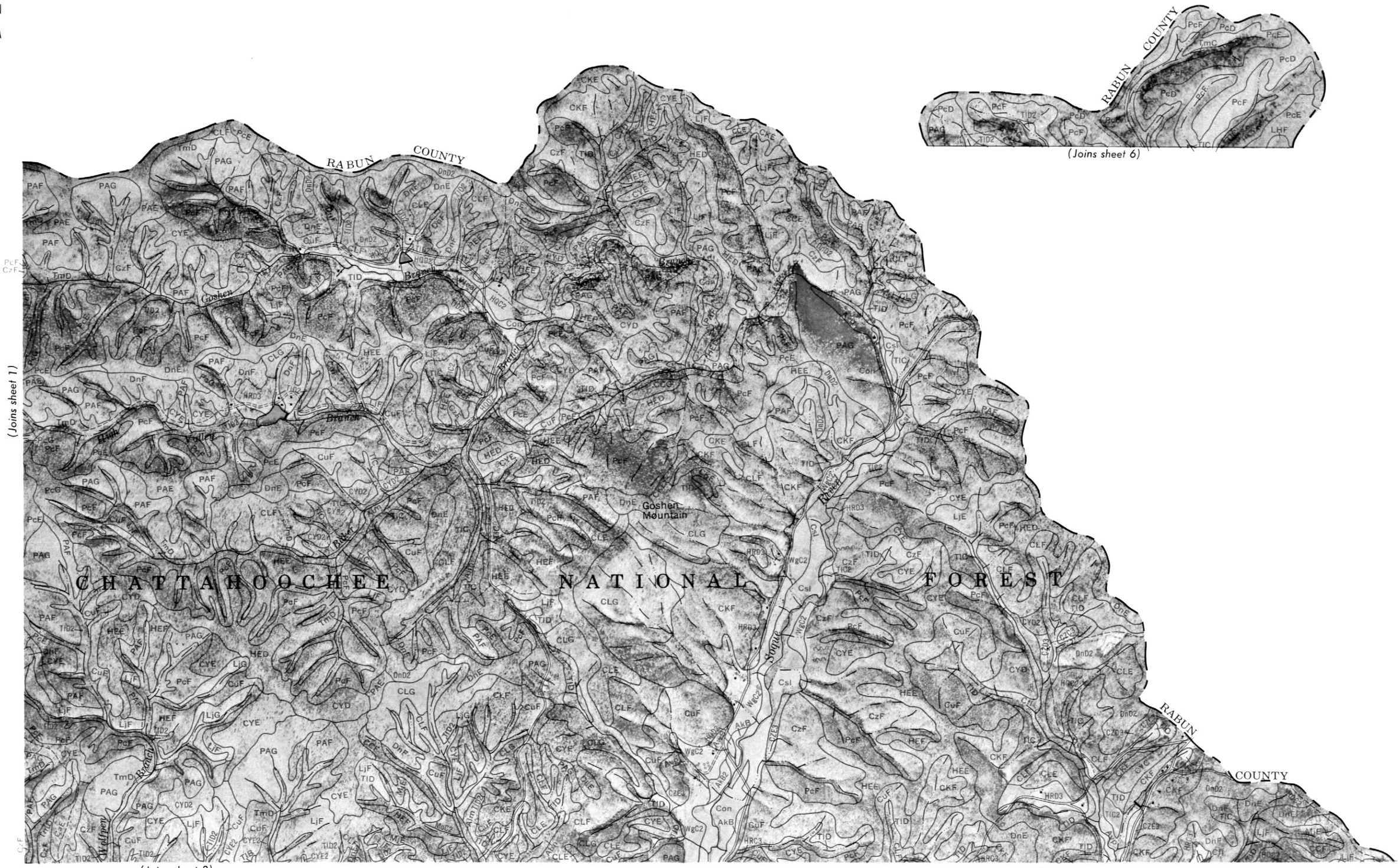
Scale 1:20000

0 5000 Feet

(2)


N
RABUN COUNTY
(Joins sheet 1)
(Joins sheet 6)
CHATTAHOOCHEE NATIONAL FOREST
Goshen Mountain
Goshen Branch
Holly Valley Branch
Brumby Branch
Squaw Creek
RABUN COUNTY
(Joins sheet 3)
0 ½ 1 Mile
Scale 1:20000
0 5000 Feet

HABERSHAM COUNTY, GEORGIA — SHEET NUMBER 3

(Joins inset, sheet 1)

TmD LiF CYE CLF CKF TID TIC TID (Joins sheet 2)

3

N

C H A T T A H O O C H E E N A T I O N A L F O R E S T

WHITE COUNTY

Hickorynut Ridge

Mack Mountain

Providence Church and School

Batesville

Wilkie

Raper Mountain

Mates Knob

Soque River

Soque

Goshen Creek

Raper Creek

Brandt Branch

Long Branch

Mates Creek

Wilkinson Creek

(Joins inset, sheet 7)

(Joins sheet 4)

0 ½ 1 Mile

Scale 1:20000

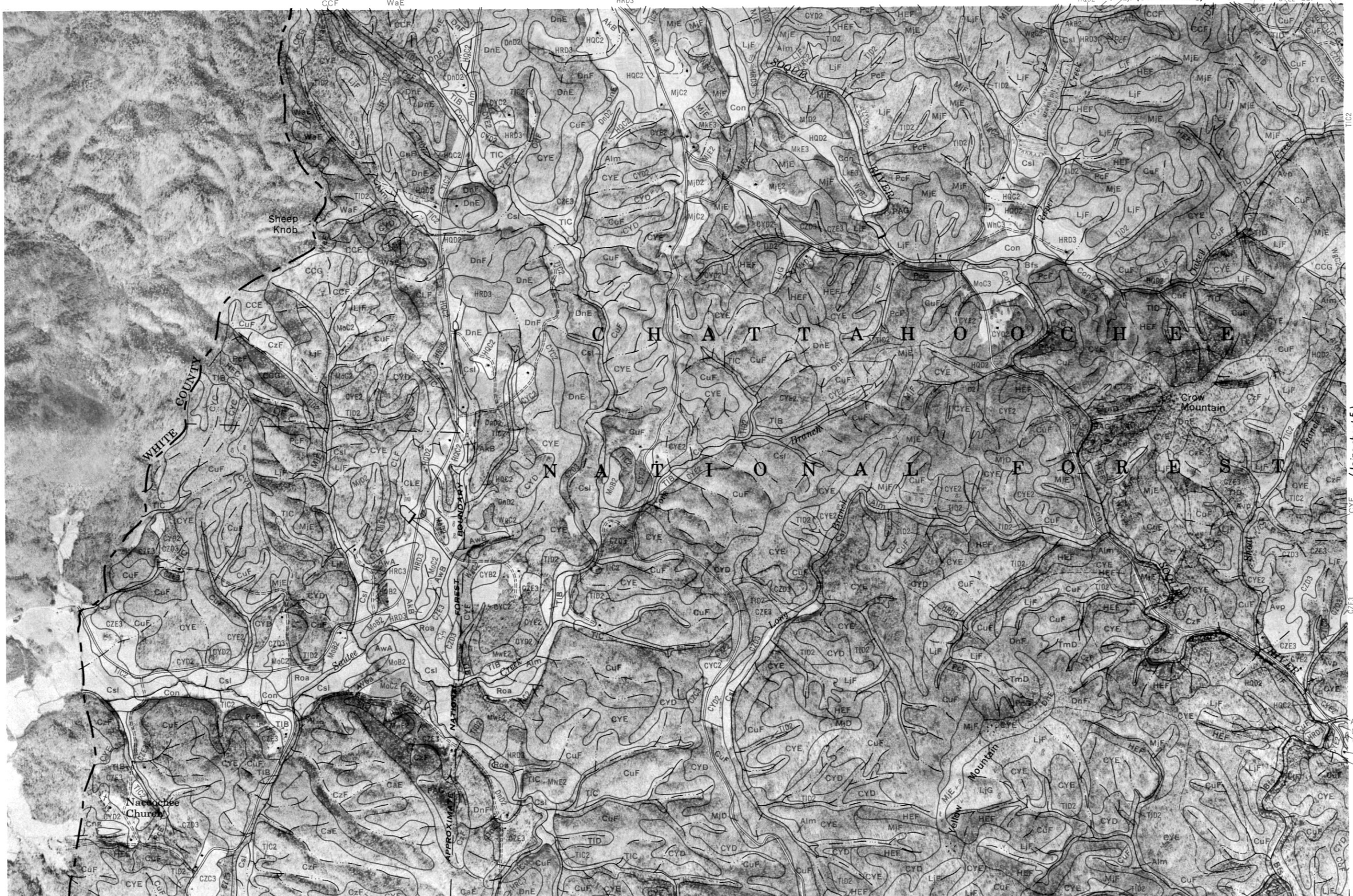
0 5000 Feet

This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1956.

HABERSHAM COUNTY, GEORGIA — SHEET NUMBER 4

4

N



(Joins sheet 3)

(Joins sheet 5)

(Joins sheet 8)

(Joins sheet 9)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Joins inset, sheet7)

(Joins sheet 4)

(Joins sheet 6)

(Joins sheet 9) | (Joins sheet 10)

5

N

Low Gap

RABUN COUNTY

Sillycook Mountain

Grassy Mountain

Seed

Unity Church

Stony Mountain

Fry Mountain

Macedonia Church

CHATTAHOOCHEE NATIONAL FOREST

BLUE RIDGE BOUNDARY

APPROXIMATE

NATIONAL FOREST

Scale 1:20000

0 1/2 1 Mile

0 5000 Feet

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(Joins inset, sheet 2)

6

N

RABUN COUNTY

RABUN COUNTY

Bear Gap

Buck Mountain

Panther Creek

Tallulah Falls School

Apple Pie Mountain

Stanley Grove Church

DENMORE RIDGE

CHATTAHOOCHEE NATIONAL FOREST

BOUNDARY

Fry Mountain

Crow Mountain

PANTHER CREEK PICNIC AREA

TALLULAH FALLS

Scale 1:20 000

1 Mile

½

0

5 000 Feet

0

(Joins sheet 5)

(Joins sheet 7)

(Joins sheet 10)

(Joins sheet 11)

N

TALLULAH GORGE

TALLULAH

RIVER

RABUN COUNTY

HABERSHAM COUNTY

Tallulah Lodge

Tallulah Falls

FALLS

Tugaloo Lake

GEORGIA POWER COMPANY RESERVOIR

TUGALOO DAM

OCONEE COUNTY

Tugaloo

CHATTAHOOCHEE NATIONAL FOREST

GEORGIA POWER COMPANY RESERVOIR

Yonah Lake

SOUTH CAROLINA

Moccasin Cr

Moody Branch

CuF Branch

Horse Creek

Alum Creek

(Joins sheet 6)

(Joins sheet 11)

RABUN

RABUN COUNTY

Oakey Mountain

CHATTAHOOCHEE NATIONAL FOREST

Ann Gap

(Joins sheet 3)

(Joins sheet 5)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Joins sheet 4)

8

N

WHITE COUNTY

CHATTAHOOCHEE NATIONAL FOREST

APPROXIMATE NATIONAL FOREST BOUNDARY

Rogers Creek

Mill Creek

Amys Creek

Mountain

Aerial

Irwin Mountain

Alec Mountain

CHATTAHOOCHEE RIVER

Amys Creek Church

(Joins sheet 9)

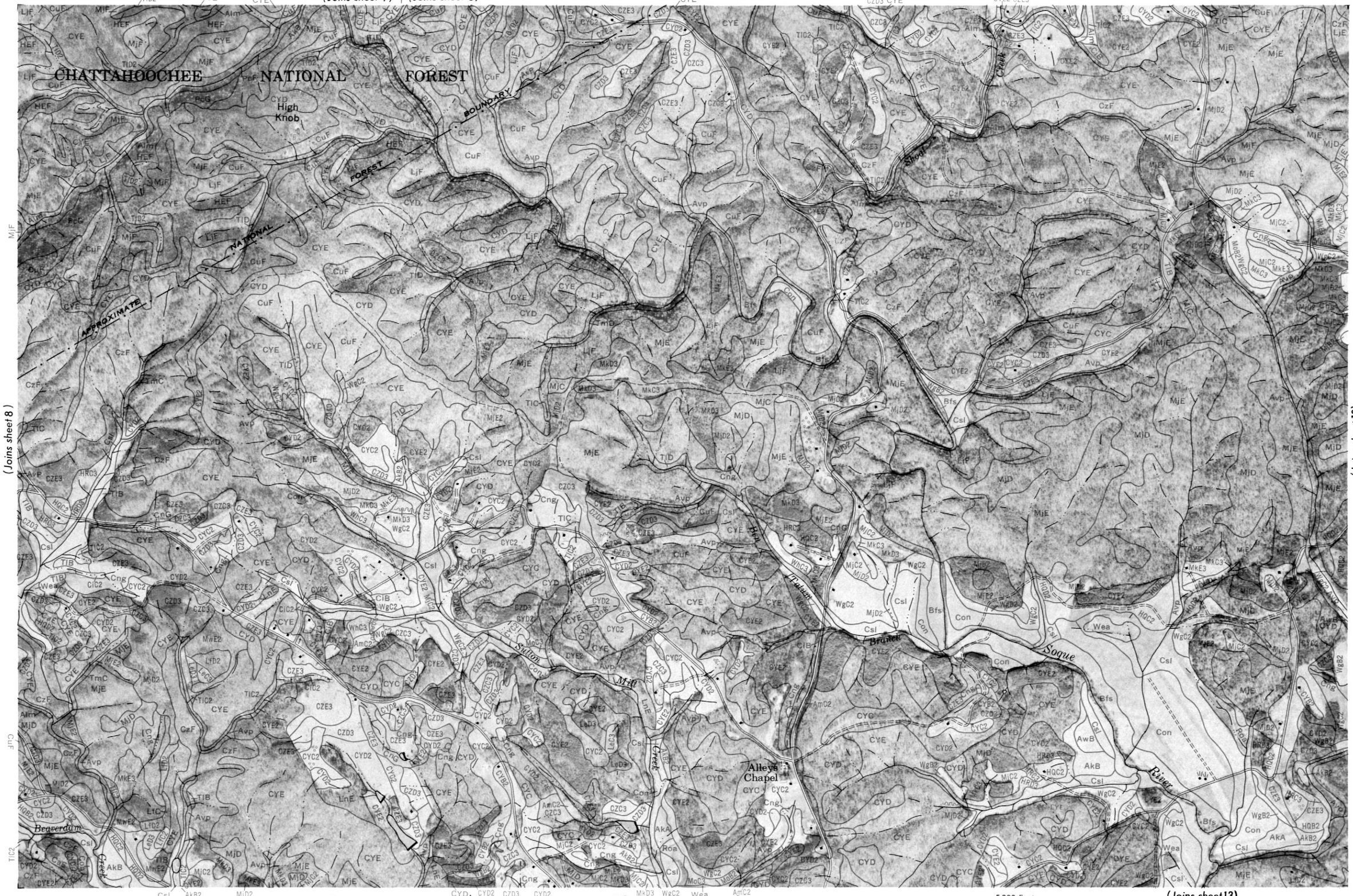
(Joins sheet 12)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Joins sheet 4) | (Joins sheet 5)



(Joins sheet 8)

(Joins sheet 10)

(Joins sheet 13)

(10)

(Joins sheet 5) | (Joins sheet 6)

N

(Joins sheet 9)

(Joins sheet 14)

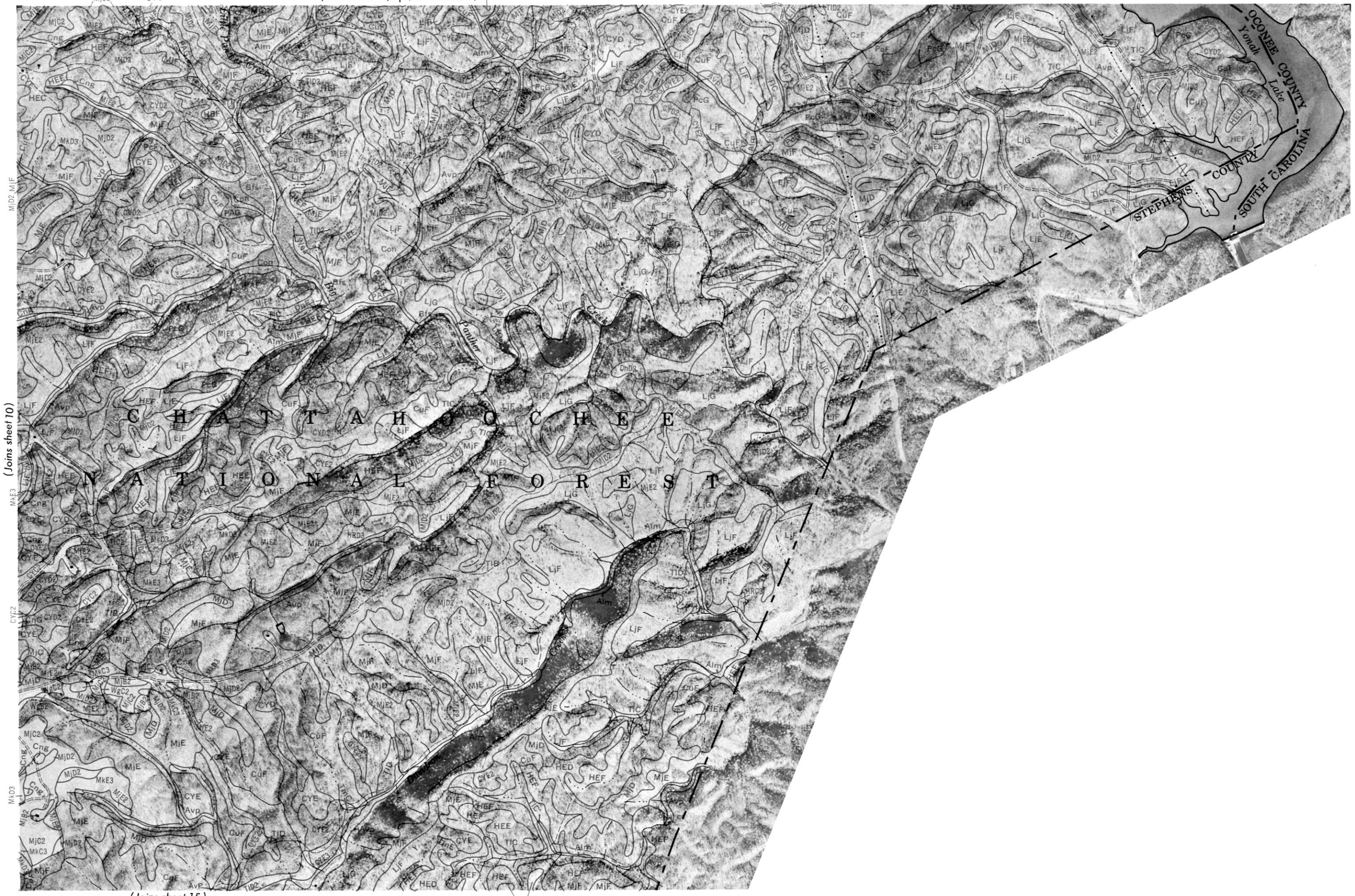
(Joins sheet 11)

(Joins sheet 6)

(Joins sheet 7)

(Joins sheet 10)

(Joins sheet 15)



0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(12)

(Joins sheet 8)

N

WHITE COUNTY

CHATTAHOOCHEE RIVER

Yellowbank Mountain

Harvest Mountain

Harvest Church

Pole Mountain

Cool Springs Church

Fairfield Church

(Joins sheet 13)

(Joins sheet 16)

0 ½ 1 Mile

Scale 1:20 000

0 5 000 Feet

(Joins sheet 9)

13

N

(Joins sheet 12)

(Joins sheet 14)

(Joins sheet 17)

North Georgia Vocational School

Bethlehem Church

Victory Church

CLARKESVILLE

Beaverdam Creek

Sutton Creek

Mud Creek

Beaverdam Creek

Mill Creek

Squaw Creek

CHATTAHOOCHEE RIVER

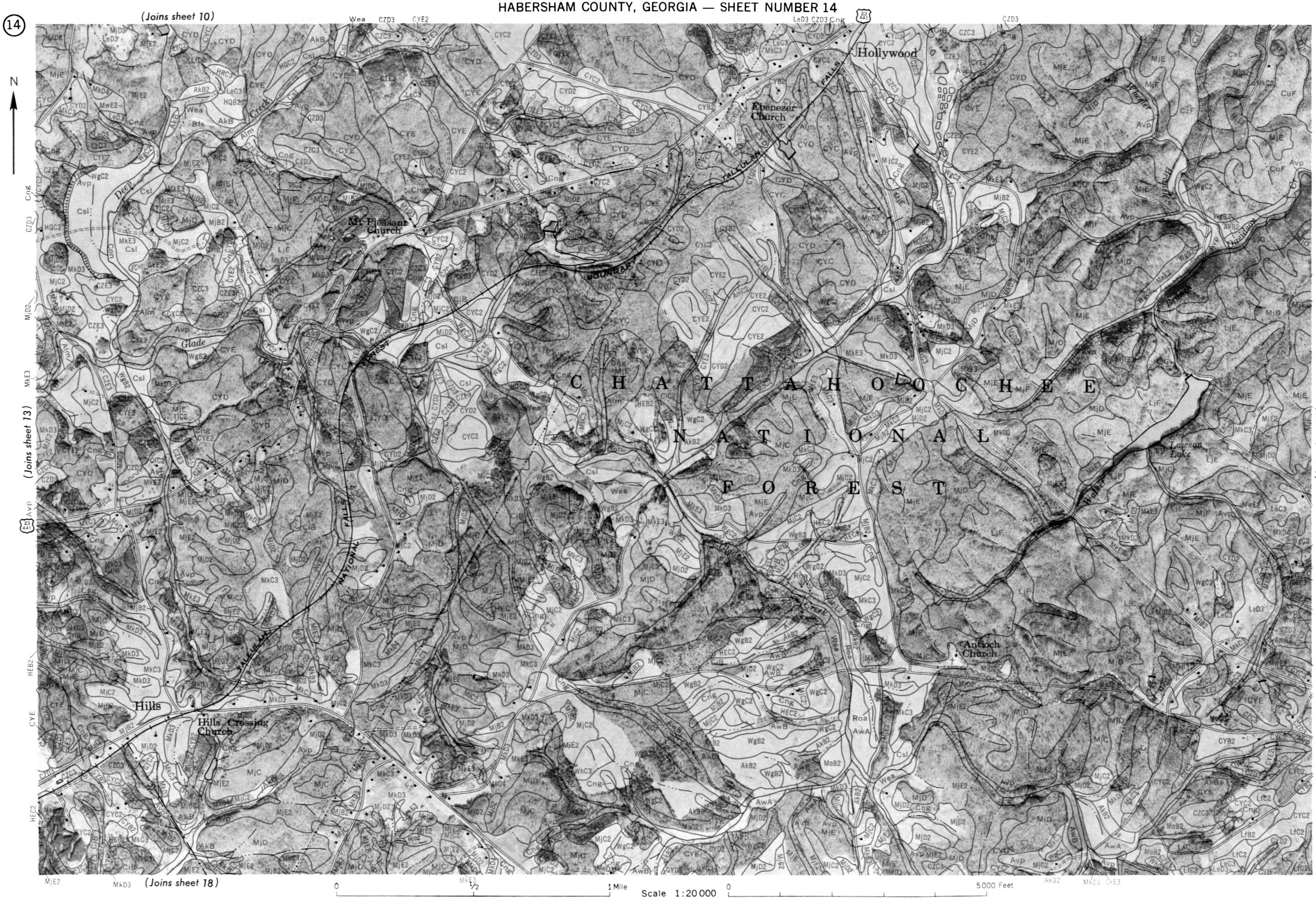
SOQUEE RIVER

TALLULAH FALLS

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet


14
(Joins sheet 10)
N
Hollywood
Ebenezer Church
Mt Pleasant Church
TALLULAH FALLS
BOUNDARY
CHATTAHOOCHEE
NATIONAL
FOREST
Lawson Lake
Antioch Church
Hills
Hills Crossing Church
Deep
Creek
Glade
Creek
(Joins sheet 13)
(Joins sheet 15)
(Joins sheet 18)
0
1/2
1 Mile
Scale 1:20 000
0
5000 Feet

(Joins sheet 11)

(Joins sheet 14)

CHATTAHOOCHEE NATIONAL FOREST

STEPHENS COUNTY

Chopped Oak Church

Mt Bethel Church

(Joins right above)

(Joins left below)

(Joins sheet 18)

N

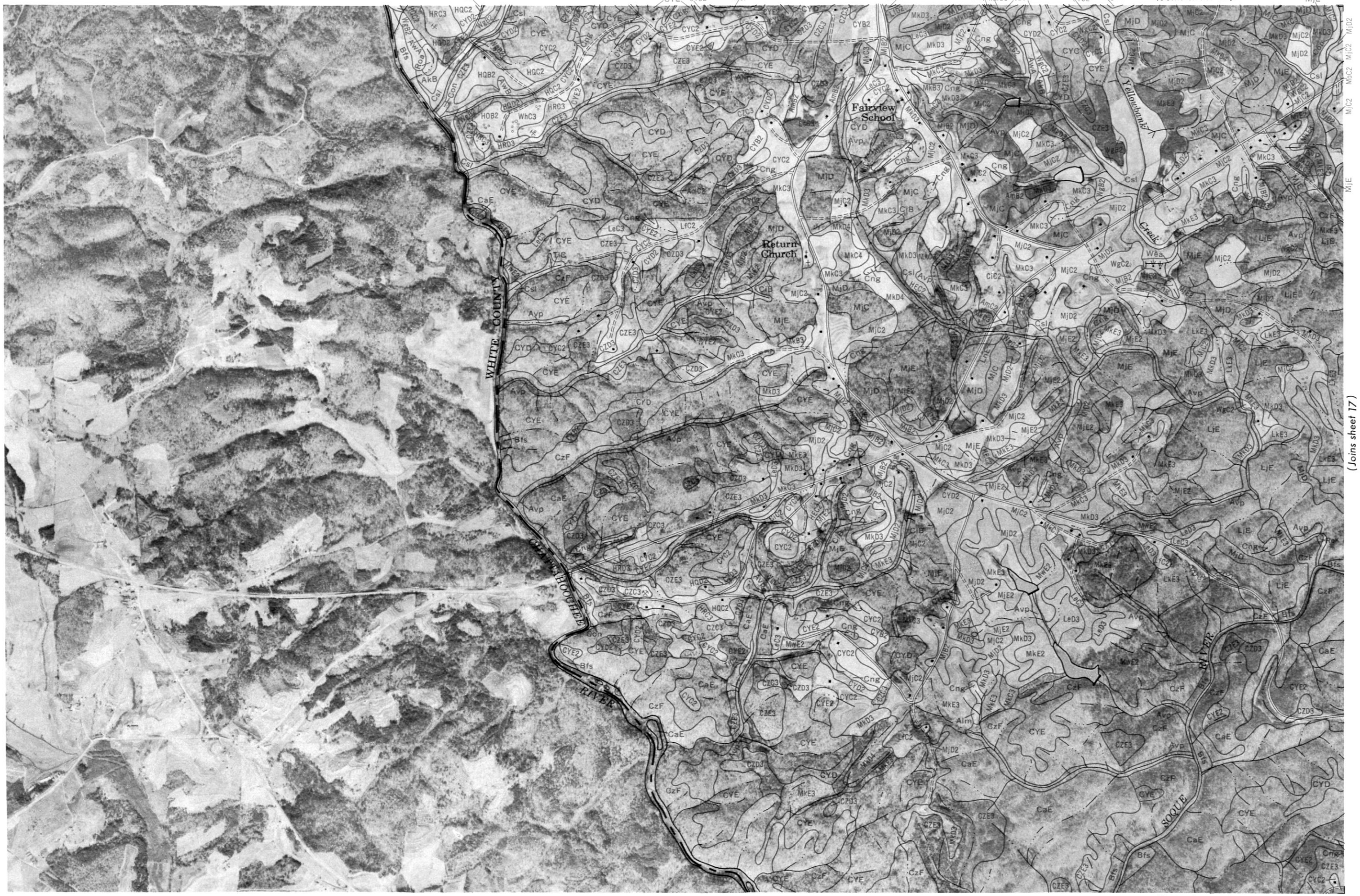
0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

N

(Joins sheet 12)



(Joins sheet 17)

0 ½ 1 Mile

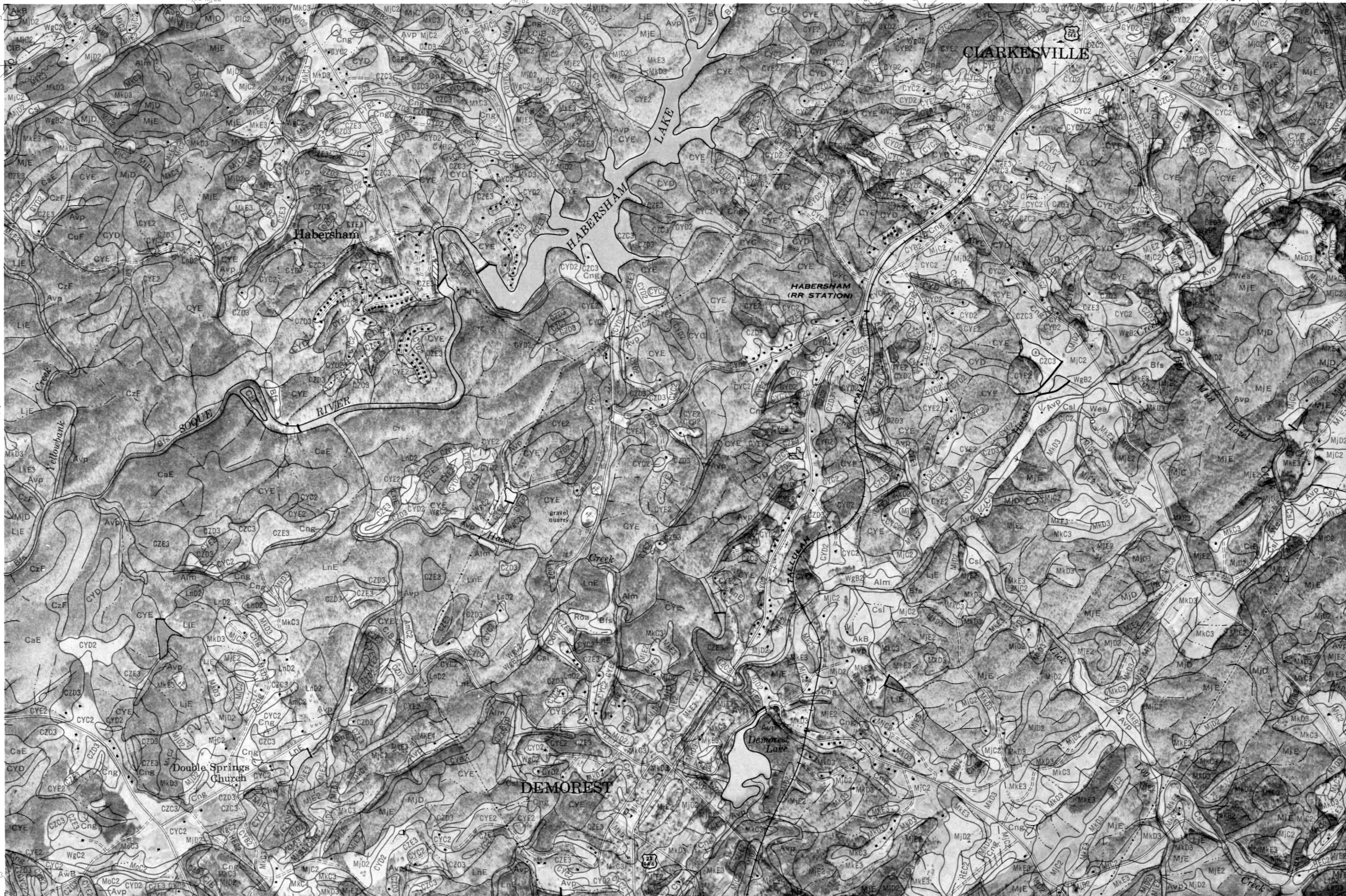
Scale 1:20 000

0 5 000 Feet

(Joins sheet 19)

(Joins sheet 13)

(Joins sheet 16)



(Joins sheet 18)

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0 ½ 1 Mile

Scale 1:20 000

0 5 000 Feet

(Joins sheet 20)

(Joins sheet 14)

N

CHATTAHOOCHEE NATIONAL FOREST

NATIONAL FOREST BOUNDARY

Glade Creek Church

Hazel Creek Church

Hazel Grove School

Community Church

LAKE RUSSELL WILDLIFE MANAGEMENT AREA

WILDLIFE MGMT AREA BOUNDARY

SOUTHERN RAILROAD

STEPHENS CO

Big Mud Creek

Hazel Creek

Mud Creek

Glade Creek

(Joins sheet 17)

(Joins sheet 21)

(Joins inset, sheet 15)

0 ½ 1 Mile

Scale 1:20 000

0 5000 Feet

(Joins sheet 16)

19

N

(Joins sheet 20)

(Joins sheet 22)

Soque River

CHATTAHOOCHEE RIVER

DUNCAN BRIDGE

WHITE COUNTY

New Hope Church

View

Mud Creek

Scale 1:20000

0 ½ 1 Mile

0 5000 Feet

HABERSHAM COUNTY, GEORGIA — SHEET NUMBER 20

20

N

(Joins sheet 17)

(Joins sheet 19)

(Joins sheet 21)

(Joins sheet 23)

Camp Creek Church

CORNELIA WATER WORKS

CORNELIA

MOUNT AIRY

SOUTHERN RAILWAY

FALLS

Mud Creek

South Fork Mud Creek

Scale 1:20 000

0 1/2 1 Mile

0 5 000 Feet

(Joins sheet 18)

(Joins sheet 20)

(Joins sheet 24)

N

CHATTAHOOCHEE NATIONAL FOREST

LAKE RUSSELL WILDLIFE MANAGEMENT AREA

Welcome Home Church

MOUNT AIRY

STEPHENS COUNTY

Scale 1:20 000

0 ½ 1 Mile

0 5000 Feet

(22)

N

WHITE COUNTY
CHATTAHOOCHEE RIVER
HALL COUNTY

Mud Creek School
Mud Creek Church
Pleasant Grove Church

(Joins sheet 19)

MjE (Joins sheet 23) MkD3 MkE4

CtB HEC2

MjD2 MjE

MjE2

LfB2 (Joins sheet 25)

0 ½ 1 Mile
Scale 1:20 000
0 5000 Feet

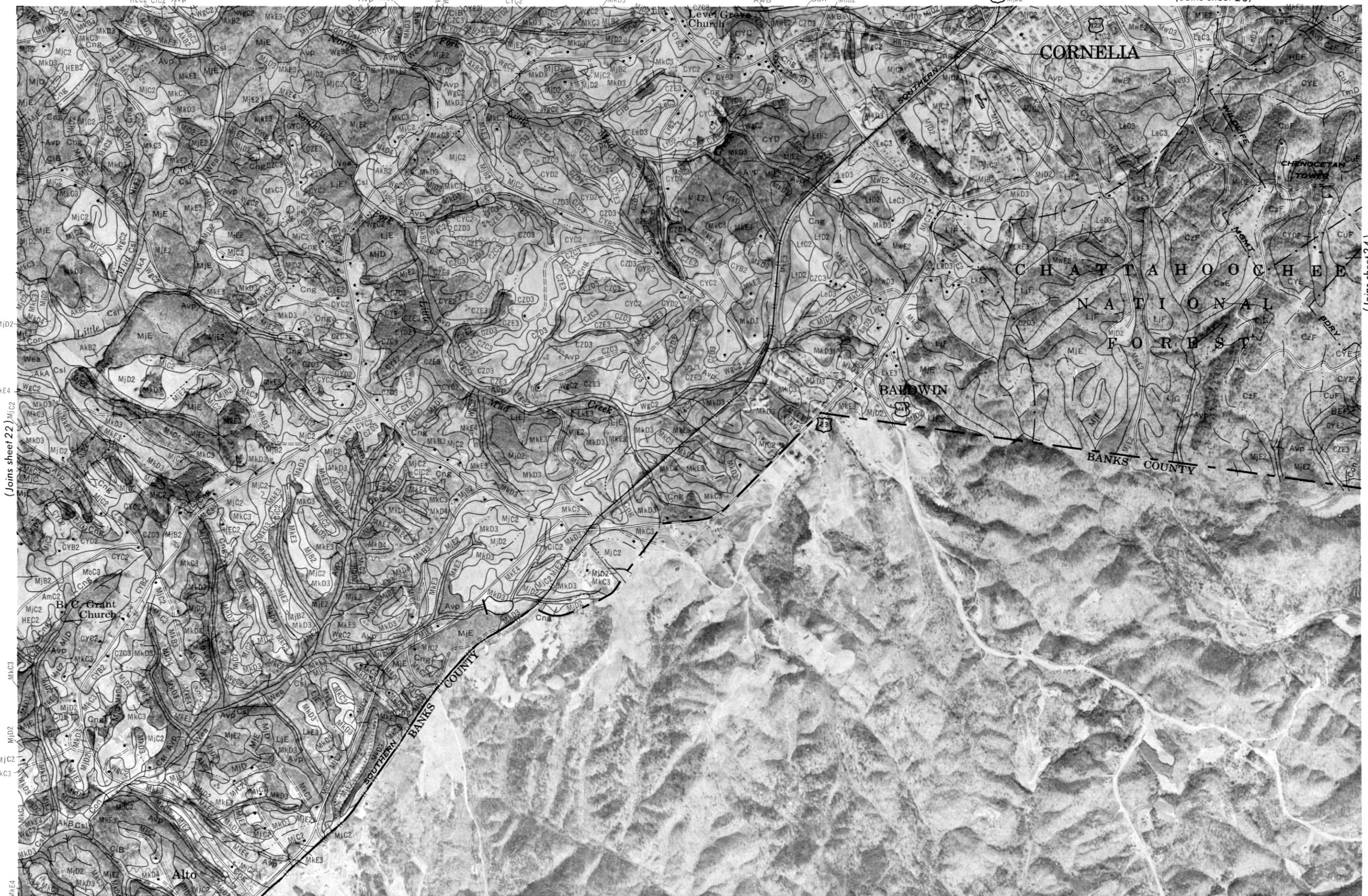
HABERSHAM COUNTY, GEORGIA — SHEET NUMBER 23

(Joins sheet 20)

(Joins sheet 24)

(Joins sheet 22)

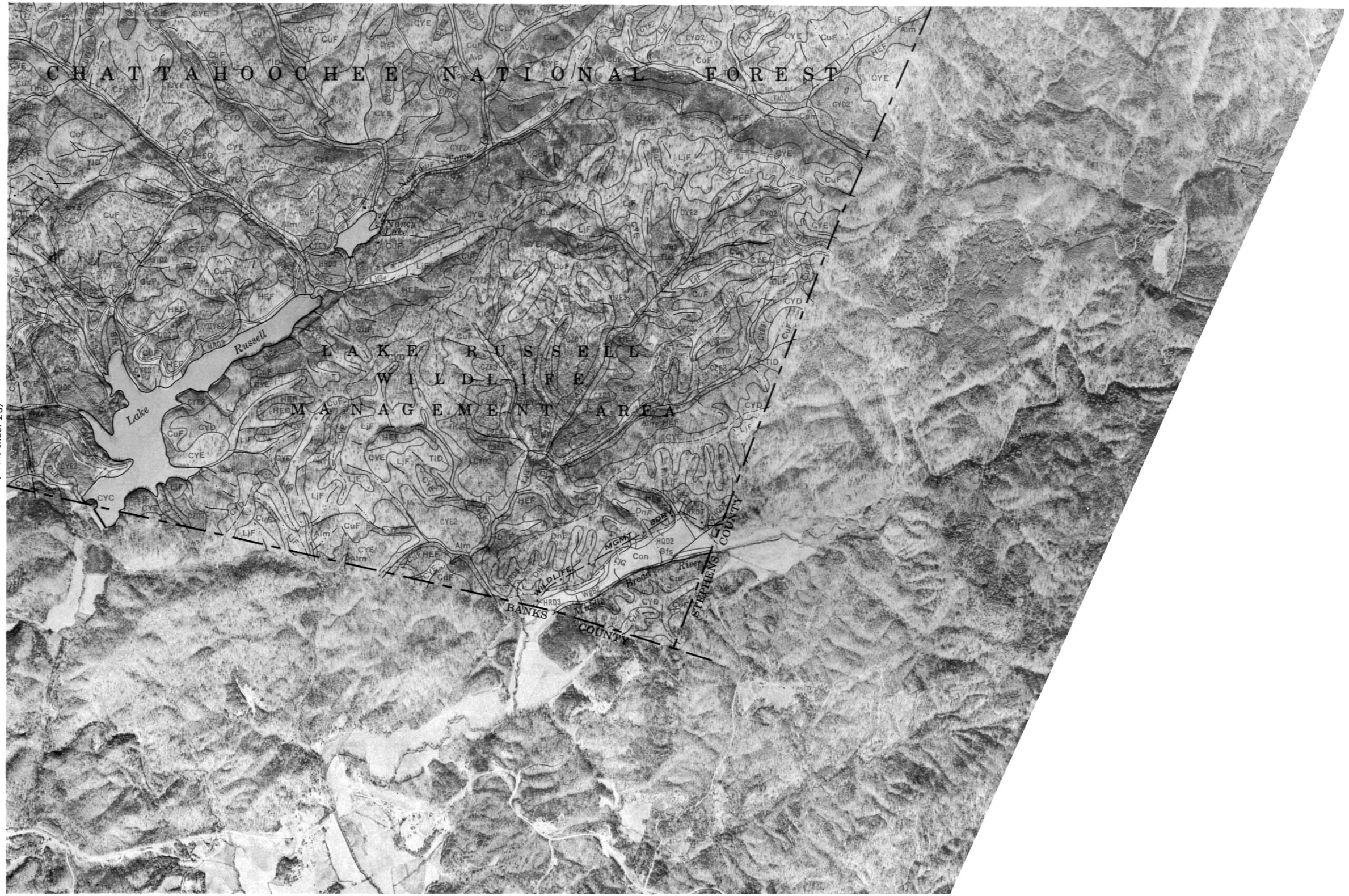
(Joins sheet 25)



(24)

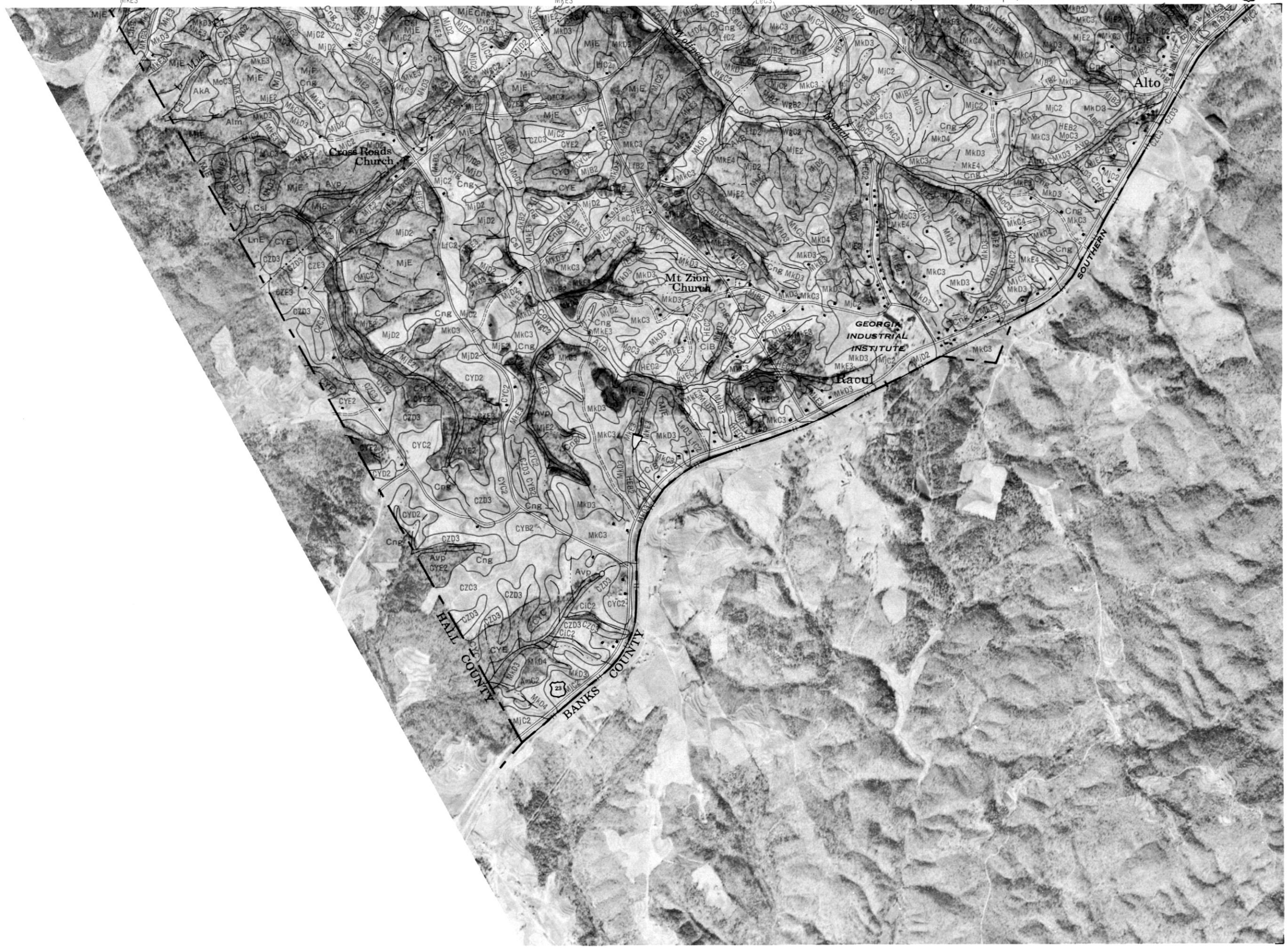
(Joins sheet 21)

N



(Joins sheet 23)

(Joins sheet 22) | (Joins sheet 23)



0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

HABERSHAM COUNTY, GEORGIA
CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads

- Dual
- Good motor
- Poor motor
- Trail

Highway markers

- National Interstate
- U. S.
- State

Railroads

- Single track
- Multiple track
- Abandoned

Bridges and crossings

- Road
- Trail, foot
- Railroad
- Ferries
- Ford
- Grade
- R. R. over
- R. R. under
- Tunnel

- Buildings
- School
- Church
- Station

- Mines and Quarries
- Mine dump
- Pits, gravel or other
- Power lines
- Pipe lines
- Cemeteries
- Dams
- Levees
- Tanks
- Sawmill
- Tower

BOUNDARIES

- National or state
- County
- Township, U. S.
- Section line, corner
- Reservation
- Land grant

DRAINAGE

Streams

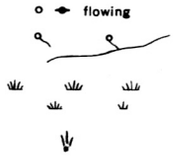
- Perennial
- Intermittent, unclass.

- Canals and ditches

Lakes and ponds

- Perennial
- Intermittent

- Wells
- Springs
- Marsh
- Wet spot



RELIEF

Escarpments

- Bedrock
- Other

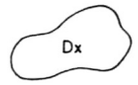
- Prominent peaks

Depressions

	Large	Small
Crossable with tillage implements		
Not crossable with tillage implements		
Contains water most of the time		

SOIL SURVEY DATA

- Soil boundary and symbol



- Gravel
- Stones
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gullies